CoNLL-SIGMORPHON 2017 Shared Task:
Universal Morphological Reinflection in 52 Languages

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Abstract

The CoNLL-SIGMORPHON 2017 shared task on supervised morphological generation required systems to be trained and tested in each of 52 typologically diverse languages. In sub-task 1, submitted systems were asked to predict a specific inflected form of a given lemma. In sub-task 2, systems were given a lemma and some of its specific inflected forms, and asked to complete the inflectional paradigm by predicting all of the remaining inflected forms. Both sub-tasks included high, medium, and low-resource conditions. Sub-task 1 received 24 system submissions, while sub-task 2 received 3 system submissions. Following the success of neural sequence-to-sequence models in the SIGMORPHON 2016 shared task, all but one of the submissions included a neural component. The results show that high performance can be achieved with small training datasets, so long as models have appropriate inductive bias or make use of additional unlabeled data or synthetic data. However, different biasing and data augmentation resulted in non-identical sets of inflected forms being predicted correctly, suggesting that there is room for future improvement.

1   Introduction

Morphology interacts with both syntax and phonology. As a result, explicitly modeling morphology has been shown to aid a number of tasks in human language technology (HLT), including machine translation (MT) (Dyer et al., 2008), speech recognition (Creutz et al., 2007), parsing (Seeker and Çetinoğlu, 2015), keyword spotting (Narasimhan et al., 2014), and word embedding (Cotterell et al., 2016b). Dedicated systems for modeling morphological patterns and complex word forms have received less attention from the HLT community than tasks that target other levels of linguistic structure. Recently, however, there has been a surge of work in this area (Durrett and DeNero, 2013; Ahlberg et al., 2014; Nicolai et al., 2015; Faruqui et al., 2016), representing a renewed interest in morphology and the potential to use advances in machine learning to attack a fundamental problem in string-to-string transformations: the prediction of one morphologically complex word form from another. This increased interest in morphology as an independent set of problems within HLT arrives at a particularly opportune time, as morphology is also undergoing a methodological renewal within theoretical linguistics where it is moving towards increased interdisciplinary work and quantitative methodologies (Moscoso del Prado Martín et al., 2004; Milin et al., 2009; Ackerman et al., 2009; Sagot and Walther, 2011; Ackerman and Malouf, 2013; Baayen et al., 2013; Blevins, 2013; Pirrelli et al., 2015; Blevins, 2016). Pushing the HLT research agenda forward in the domain of morphology promises to lead to mutually highly beneficial dialogue between the two fields.

Rich morphology is the norm among the languages of the world. The linguistic typology database WALS shows that 80% of the world's languages mark verb tense through morphology while 65% mark grammatical case (Haspelmath et al., 2005). The more limited inflectional system of English may help to explain the fact that morphology has received less attention in the computational literature than it is arguably due.

The CoNLL-SIGMORPHON 2017 shared task worked to promote the development of robust systems that can learn to perform cross-linguistically

Lang	Lemma	Inflection	Inflected form
en	hug	V;PST	hugged
	spark	V;V.PTCP;PRS	sparking
es	liberar	V;IND;FUT;2;SG	liberarás
	descomponer	V;NEG;IMP;2;PL	no descompongáis
de	aufbauen	V;IND;PRS;2;SG	baust auf
	Ärztin	N;DAT;PL	Ärztinnen

Table 1: Example training data from sub-task 1. Each training example maps a *lemma* and *inflection* to an *inflected form*, The inflection is a bundle of *morphosyntactic features*. Note that inflected forms (and lemmata) can encompass multiple words. In the test data, the last column (the inflected form) must be predicted by the system.

reliable morphological inflection and morphological paradigm cell filling using varying amounts of training data. We note that this is also the first CoNLL-hosted shared task to focus on morphology. The task itself featured training and development data from 52 languages representing a range of language families. Many of the languages included were extremely low-resource, e.g., Quechua, Navajo, and Haida. The chosen languages also encompassed diverse morphological properties and inflection processes. Whenever possible, three data conditions were given for each language: low, medium, and high. In the inflection sub-task, these corresponded to seeing 100 examples, 1,000 examples, and 10,000 examples respectively in the training data for almost all languages. The results show that encoder-decoder recurrent neural network models (RNNs) can perform very well even with small training sets, if they are augmented with various mechanisms to cope with the low-resource setting. The shared task training, development, and test data are released publicly.[1]

2 Task and Evaluation Details

This year's shared task contained two sub-tasks, which represented slightly different learning scenarios that might be faced by an HLT engineer or (roughly speaking) a human learner. Beyond manually vetted[2] data for training, development and test, monolingual corpus data (Wikipedia dumps) was also provided for both of the sub-tasks. Figure 1 illustrates the two tasks and defines some terminology.

Lemma	Inflections	Inflected forms
Train		
afrontar	V;IND;PST;1;PL;IPFV	afrontábamos
afrontar	V;SBJV;PST;3;PL;LGSPEC1	afrontaran
afrontar	V;NEG;IMP;2;PL	no afrontéis
afrontar	V;NEG;IMP;3;SG	no afronte
afrontar	V;COND;2;SG	afrontarías
afrontar	V;IND;FUT;3;SG	afrontará
afrontar	V;SBJV;FUT;3;PL	afrontaren
	…	
Test		
revocar	V;IND;PST;1;PL;IPFV	revocábamos
revocar	V;SBJV;PST;3;PL;LGSPEC1	—
revocar	V;NEG;IMP;2;PL	no revoquéis
revocar	V;NEG;IMP;3;SG	—
revocar	V;COND;2;SG	revocarías
revocar	V;IND;FUT;3;SG	—
revocar	V;SBJV;FUT;3;PL	—
	…	

Table 2: Example training and test data from sub-task 2 in Spanish. At training time, the system is provided with complete paradigms, i.e., tables of all inflections for a given lemma, like the example at top. At test time, the system is asked to complete partially filled paradigms, like the example at bottom; note that the inflectional features for the missing paradigm cells are provided in the input.

The CoNLL-SIGMORPHON 2017 shared task is the second shared task in a series that began with the SIGMORPHON 2016 shared task on morphological reinflection (Cotterell et al., 2016a). In contrast to 2016, it happens that both of the 2017 sub-tasks actually involve only inflection, not reinflection.[3] Nonetheless, we kept "reinflection" in this year's title to make it easier to refer to the series of tasks.

2.1 Sub-Task 1: Inflected Form from Lemma

The first sub-task in Figure 1 required morphological generation with sparse training data, something that can be practically useful for MT and other downstream tasks in NLP. Here, participants were given examples of inflected forms as shown in Table 1. Each test example asked them to produce some other inflected form when given a lemma and a bundle of morphosyntactic features.

The training data was sparse in the sense that it included only a few inflected forms from each lemma. That is, as in human L1 learning, the learner does not necessarily observe any complete paradigms in a language where the paradigms are
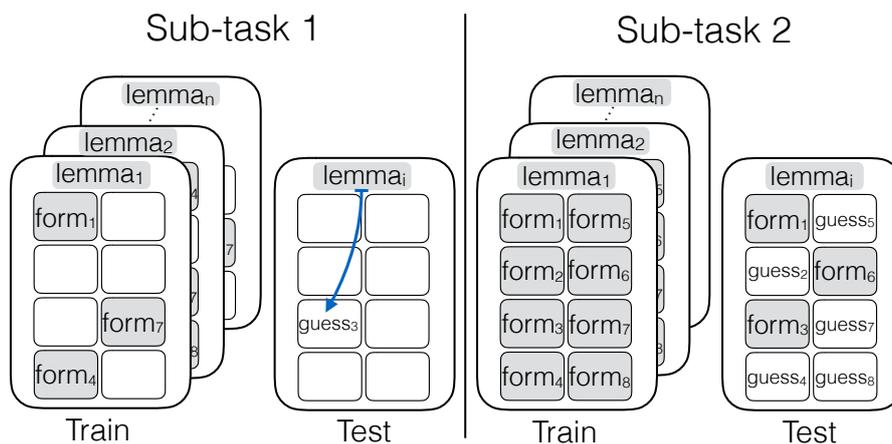
Figure 1: Overview of sub-tasks. Each large rectangle represents a **paradigm**, i.e., the full set of inflected forms for some lemma. Each small rectangle within the paradigm is a **cell** that is associated with a known morphological feature bundle, and lists a string that either is observed (shaded background) or must be predicted (white background). Sub-task 1 featured sparse training data and asked systems to inflect individual forms at test time. Sub-task 2 provides dense paradigms as training data and asks for full paradigm completion of unseen items.

large (e.g., dozens of inflected forms per lemma).[4]
Key points:

1. Our sub-task 1 is similar to sub-task 1 of the SIGMORPHON 2016 shared task (Cotterell et al., 2016a), but with structured inflectional tags (Sylak-Glassman et al., 2015a), learning curve assessment, and many new typologically diverse languages, including low-resource languages.

2. The task is inflection: Given an input lemma and desired output tag, participants had to generate the correct output inflected form (a string).

3. The supervised training data consisted of individual forms (Table 1) that were sparsely sampled from a large number of paradigms.

4. Forms that are empirically more frequent were more likely to appear in both training and test data (see §3 for details).

5. Unannotated corpus data was also provided to participants.

6. Systems were evaluated after training on 10^2, 10^3, and 10^4 forms.

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[4] Of course, human L1 learners do not get to observe explicit morphological feature bundles for the types that they observe. Rather, they analyze inflected tokens in context to discover both morphological features (including *inherent* features such as noun gender (Arnon and Ramscar, 2012)) and paradigmatic structure (number of forms per lemma, number of expressed featural contrasts such as tense, number, person. . .).

2.2 Sub-Task 2: Paradigm Completion

The second sub-task in Figure 1 focused on paradigm completion, also known as "the paradigm cell filling problem" (Ackerman et al., 2009).

Here, participants were given a few complete inflectional paradigms as training data. At test time, partially filled paradigms, i.e. paradigms with significant gaps in them, were to be completed by filling out the missing cells. Table 2 gives examples.

Thus, sub-task 2 requires predicting many inflections of the same lemma. Recall that sub-task 1 also required the system to predict several inflections of the same lemma (when they appear as separate examples in test data). However, in sub-task 2, one of our test-time evaluation metrics (§2.3) is full-paradigm accuracy. Also, the sub-task 2 training data provides full paradigms, in contrast to sub-task 1 where it included only a few inflected forms per lemma. Finally, at test time, sub-task 2 presents each lemma along with some of its inflected forms, which is potentially helpful if the lemma had not appeared previously in training data.

Apart from the theoretical interest in this problem (Ackerman and Malouf, 2013), this sub-task is grounded in the practical problem of extrapolation of basic resources for a language, where only a few complete paradigms may be available from a native speaker informant (Sylak-Glassman et al., 2016) or a reference grammar. L2 classroom instruction also asks human students to memorize

example paradigms and generalize from them.

Key points:

1. The training data consisted of complete paradigms.

2. Not all paradigms within a language have the same shape. A noun lemma will have a different set of cells than a verb lemma does, and verbs of different classes (e.g., lexically perfective vs. imperfective) may also have different sets of cells.

3. The task was paradigm completion: given a sparsely populated paradigm, participants should generate the inflected forms (strings) for all missing cells.

4. The task simulates learning from compiled grammatical resources and inflection tables, or learning from a limited time with a native-language informant in a fieldwork scenario.

5. Three training sets were given, building up in size from only a few complete paradigms to a large number (dozens).

2.3 Evaluation

Each team participating in a given sub-task was asked to submit 156 versions of their system, where each version was trained using a different training set (3 training sizes $\times$ 52 languages) and its corresponding development set. We evaluated each submitted system on its corresponding test set, i.e., the test set for its language.

We computed three evaluation metrics: (i) Overall 1-best test-set accuracy, i.e., *is the predicted paradigm cell correct?* (ii) average Levenshtein distance, i.e., *how badly does the predicted form disagree with the answer?* (iii) Full-paradigm accuracy, i.e., *is the complete paradigm correct?* This final metric only truly makes sense in sub-task 2, where full paradigms are given for evaluation. For each sub-task, the three data conditions (low, medium, and high) resulted in a learning curve. For each system in each condition, we report the average metrics across all 52 languages.

3 Data

3.1 Languages

The data for the shared task was highly multilingual, comprising 52 unique languages. Data for 47 of the languages came from the English edition of Wiktionary, a large multi-lingual crowd-sourced dictionary containing morphological paradigms for many lemmata.[5] Data for Khaling, Kurmanji Kurdish, and Sorani Kurdish was created as part of the Alexina project (Walther et al., 2013, 2010; Walther and Sagot, 2010).[6] Novel data for Haida, a severely endangered North American language isolate, was prepared by Jordan Lachler (University of Alberta). The Basque language data was extracted from a manually designed finite-state morphological analyzer (Alegria et al., 2009).

The shared task language set is genealogically diverse, including languages from 10 language stocks. Although the majority of the languages are Indo-European, we also include two language isolates (Haida and Basque) along with languages from Athabaskan (Navajo), Kartvelian (Georgian), Quechua, Semitic (Arabic, Hebrew), Sino-Tibetan (Khaling), Turkic (Turkish), and Uralic (Estonian, Finnish, Hungarian, and Northern Sami). The shared task language set is also diverse in terms of morphological structure, with languages which use primarily prefixes (Navajo), suffixes (Quechua and Turkish), and a mix, with Spanish exhibiting internal vowel variations along with suffixes and Georgian using both infixes and suffixes. The language set also exhibits features such as templatic morphology (Arabic, Hebrew), vowel harmony (Turkish, Finnish, Hungarian), and consonant harmony (Navajo) which require systems to learn non-local alternations. Finally, the resource level of the languages in the shared task set varies greatly, from major world languages (e.g. Arabic, English, French, Spanish, Russian) to languages with few speakers (e.g. Haida, Khaling).

3.2 Data Format

For each language, the basic data consists of triples of the form (lemma, feature bundle, inflected form), as in Table 1. The first feature in the bundle always specifies the core part of speech (e.g., verb). All features in the bundle are coded according to the UniMorph Schema, a cross-linguistically consistent universal morphological feature set (Sylak-Glassman et al., 2015a,b).

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[5] https://en.wiktionary.org/ (08-2016 snapshot)

[6] https://gforge.inria.fr/projects/alexina/

3.3 Extraction from Wiktionary

For each of the 47 Wiktionary languages, Wiktionary provides a number of tables, each of which specifies the full inflectional paradigm for a particular lemma. These tables were initially extracted via a multi-dimensional table parsing strategy (Kirov et al., 2016; Sylak-Glassman et al., 2015a).

As noted in §2.2, different paradigms may have different shapes. To prepare the shared task data, each language's parsed tables from Wiktionary were grouped according to their tabular structure and number of cells. Each group represents a different type of paradigm (e.g., verb). We used only groups with a large number of lemmata, relative to the number of lemmata available for the language as a whole. For each group, we associated a feature bundle with each cell position in the table, by manually replacing the prose labels describing grammatical features (e.g. "accusative case") with UniMorph features (e.g. acc). This allowed us to extract triples as described in the previous section.

By applying this process across the 47 languages, we constructed a large multilingual dataset that refines the parsed tables from previous work. This dataset was sampled to create appropriately-sized data for the shared task, as described in §3.4.[7] Full and sampled dataset sizes by language are given in Table 3.

Systematic syncretism is collapsed in Wiktionary. For example, in English, feature bundles do not distinguish between different person/number forms of past tense verbs, because they are identical.[8] Thus, the past-tense form `went` appears only once in the table for `go`, not six times, and gives rise to only one triple, whose feature bundle specifies past tense but not person and number.

3.4 Sampling the Train-Dev-Test Splits

From each language's collection of paradigms, we sampled the training, development, and test sets as follows. These datasets can be obtained from http://www.sigmorphon.org/conll2017.

Our first step was to construct probability distributions over the (lemma, feature bundle, inflected form) triples in our full dataset. For each triple, we counted how many tokens the inflected form has in the February 2017 dump of Wikipedia for that language. Note that this simple "string match" heuristic overestimates the count, since strings are ambiguous: not all of the counted tokens actually render that feature bundle.[9]

From these counts, we estimated a unigram distribution over triples, using Laplace smoothing (add-1 smoothing). We then sampled 12000 triples without replacement from this distribution. The first 100 were taken as the low-resource training set for sub-task 1, the first 1000 as the medium-resource training set, and the first 10000 as the high-resource training set. Note that these training sets are nested, and that the highest-count triples tend to appear in the smaller training sets.

The final 2000 triples were randomly shuffled and then split in half to obtain development and test sets of 1000 forms each. The final shuffling was performed to ensure that the development set is similar to the test set. By contrast, the development and test sets tend to contain lower-count triples than the training set.[10] In those languages where we have less than 12000 total forms, we omit the high-resource training set (all languages have at least 3000 forms).

To sample the data for sub-task 2, we perform a similar procedure. For each paradigm in our full dataset, we counted the number of tokens in Wikipedia that matched any of the inflected forms in the paradigm. From these counts, we estimated a unigram distribution over paradigms, using Laplace smoothing. We sampled 300 paradigms without replacement from this

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[7]Full, unsampled Wiktionary parses are made available at unimorph.org on a rolling basis.

[8]In this example, Wiktionary omits the single exception: the lemma `be` distinguishes between past tenses `was` and `were`.

[9]For example, in English, any token of the string `walked` will be double-counted as both the past tense and the past participle of the lemma `walk`. This problem holds for all regular English verbs. Similarly, when we are counting the present-tense tokens `lay` of the lemma `lay`, we will also include tokens of the string `lay` that are actually the past tense of `lie`, or are actually the adjective or noun senses of `lay`. The alternative to double-counting each ambiguous token would have been to use EM to split the token's count of 1 unequally among its possible analyses, in proportion to their estimated prior probabilities (Cotterell et al., 2015).

[10]This is a realistic setting, since supervised training is usually employed to generalize from frequent words that appear in annotated resources to less frequent words that do not. Unsupervised learning methods also tend to generalize from more frequent words (which can be analyzed more easily by combining information from many contexts) to less frequent ones.

distribution. The low-resource training sets contain the first 10 paradigms, the medium-resource training set contains the first 50, and high-resource training set contains the first 200. Again, these training sets are nested. Note that since different languages have paradigms of different sizes, the actual number of training exemplars may differ drastically.

With the same motivation as before, we shuffled the remaining 100 forms and took the first 50 as development and the next 50 as test. (In those languages with fewer than 300 forms, we again omitted the high-resource training setting.) For each development or test paradigm, we chose about $\frac{1}{5}$ of the slots to provide to the system as input along with the lemma, asking the system to predict the remaining $\frac{4}{5}$. We determined which cells to keep by independently flipping a biased coin with probability 0.2 for each cell.

Because of the count overestimates mentioned above, our sub-task 1 dataset overrepresents triples where the inflected form (the answer) is ambiguous, and our sub-task 2 dataset overrepresents paradigms that contain ambiguous inflected forms. The degree of ambiguity varied among languages: the average number of triples per inflected form string ranged from 1.00 in Sorani to 2.89 in Khaling, with an average of 1.43 across all languages. Despite this distortion of true unigram counts, we believe that our datasets captured a sufficiently broad sample of the feature combinations for every language.

4 Previous Work

Most recent work in inflection generation has focused on sub-task 1, i.e., generating inflected forms from the lemma. Numerous, methodologically diverse approaches have been published. We highlight a representative sample of recent work. Durrett and DeNero (2013) heuristically extracted transformation rules and trained a semi-Markov model (Sarawagi and Cohen, 2004) to learn when to apply them to the input. Nicolai et al. (2015) trained a discriminative string-to-string monotonic transduction tool—DIRECTL+ (Jiampojamarn et al., 2008)—to generate inflections. Ahlberg et al. (2014) reduced the problem to multi-class classification, where they used finite-state techniques to first generalize inflectional patterns and then trained a feature-rich classifier to choose the optimal such pattern to inflect

unseen words (Ahlberg et al., 2015). Finally, Malouf (2016), Faruqui et al. (2016) and Kann and Schütze (2016) proposed a neural-based sequence-to-sequence models (Sutskever et al., 2014), with Kann and Schütze making use of an attention mechanism (Bahdanau et al., 2015). Overall, the neural approaches have generally been found to be the most successful.

Some work has also focused on scenarios similar to sub-task 2. For example, Dreyer and Eisner (2009) modeled the distribution over the paradigms of a language as a Markov Random Field (MRF), where each cell is represented as a string-valued random variable. The MRF's factors are specified as weighted finite-state machines of the form given by Dreyer et al. (2008). Building upon this, Cotterell et al. (2015) proposed using a Bayesian network where both lemmata (repeated within a paradigm) and affixes (repeated across paradigms) were encoded as string-valued random variables. That work required its finite-state transducers to take a more restricted form (Cotterell et al., 2014) for computational reasons. Finally, Kann et al. (2017a) proposed a multi-source sequence-to-sequence network, allowing a neural transducer to exploit multiple source forms simultaneously.

SIGMORPHON 2016 Shared Task. Last year, the SIGMORPHON 2016 shared task (`http://sigmorphon.org/sharedtask`) focused on 10 languages (including 2 surprise languages). As for the present 2017 task, most of the 2016 data was derived from Wiktionary. The 2016 shared task had submissions from 9 competing teams with members from 11 universities. As mentioned in §2.1, our sub-task 1 is an extension of sub-task 1 from 2016. The other sub-tasks in 2016 focused on the more general reinflection problem, where systems had to learn to map from any inflected form to any other with varying degrees of annotations. See Cotterell et al. (2016a) for details.

5 The Baseline System

The shared task provided a baseline system to participants that addressed both tasks and all languages. The system was designed for speed of application and also for adequate accuracy with little training data, in particular in the low and medium data conditions. The design of the baseline was inspired by the University of Colorado's submission (Liu and Mao, 2016) to the SIGMORPHON 2016

Language	Family	Lemmata / Forms	High	Medium	Low	Dev	Test	Pr	Su	Ap
Albanian	Indo-European	589 / 33483	587	379	82	384	369	56.24	95.14	1.09
Arabic	Semitic	4134 / 140003	3181	811	96	809	831	54.64	90.89	31.61
Armenian	Indo-European	7033 / 338461	4657	907	99	875	902	22.81	94.27	1.78
Basque	Isolate	26 / 11889	26	26	22	26	22	97.63	92.07	12.87
Bengali†	Indo-Aryan	136 / 4443	136	134	65	65	68	0.04	94.98	17.59
Bulgarian	Slavic	2468 / 55730	2133	716	98	742	744	15.65	92.09	4.28
Catalan	Romance	1547 / 81576	1545	742	96	744	733	0.41	98.04	6.89
Czech	Slavic	5125 / 134527	3862	836	98	852	850	8.73	87.07	0.99
Danish	Germanic	3193 / 25503	3148	875	100	869	865	0.17	81.52	1.28
Dutch	Germanic	4993 / 55467	4146	895	99	899	899	3.06	80.61	4.30
English	Germanic	22765 / 115523	8377	989	100	985	983	0.06	79.00	0.79
Estonian	Uralic	886 / 38215	886	587	94	553	577	25.94	95.70	10.18
Faroese	Germanic	3077 / 45474	2967	842	100	839	880	0.66	80.52	12.93
Finnish	Uralic	57642 / 2490377	8668	981	100	984	986	31.47	94.47	10.57
French	Romance	7535 / 367732	5588	941	98	940	943	2.79	97.78	3.95
Georgian	Kartvelian	3782 / 74412	3537	861	100	872	874	3.28	94.70	0.42
German	Germanic	15060 / 179339	6767	959	100	964	964	5.03	65.83	5.01
Haida†	Isolate	41 / 7040	41	41	40	34	38	0.26	98.96	0.49
Hebrew	Semitic	510 / 13818	510	470	95	431	453	43.58	78.96	2.40
Hindi	Indo-Aryan	258 / 54438	258	252	85	254	255	8.16	98.65	11.14
Hungarian	Uralic	13989 / 490394	7097	966	100	967	964	0.52	97.00	0.52
Icelandic	Germanic	4775 / 76915	4108	899	100	906	899	0.56	84.54	9.28
Irish	Celtic	7464 / 107298	5040	906	99	913	893	55.09	61.60	4.47
Italian	Romance	10009 / 509574	6365	953	100	940	936	18.81	92.38	20.92
Khaling	Sino-Tibetan	591 / 156097	584	426	92	411	422	76.39	99.04	24.87
Kurmanji Kurdish	Iranian	15083 / 216370	7046	945	100	949	958	9.62	91.43	0.90
Latin	Romance	17214 / 509182	6517	943	100	939	945	4.12	90.04	47.74
Latvian	Baltic	7548 / 136998	5293	923	100	920	924	3.69	91.50	2.91
Lithuanian	Baltic	1458 / 34130	1443	632	96	664	639	3.64	90.58	35.32
Lower Sorbian	Germanic	994 / 20121	994	626	96	625	630	0.24	93.33	0.48
Macedonian	Slavic	10313 / 168057	6079	958	100	939	946	1.15	90.56	0.53
Navajo	Athabaskan	674 / 12354	674	496	91	491	491	79.03	35.08	21.49
Northern Sami	Uralic	2103 / 62677	1964	745	93	738	744	4.62	90.39	18.12
Norwegian Bokmål	Germanic	5527 / 19238	5041	925	100	928	930	0.19	92.77	2.08
Norwegian Nynorsk	Germanic	4689 / 15319	4413	915	98	914	919	0.35	88.59	1.98
Persian	Iranian	273 / 37128	273	269	82	268	267	27.1	95.28	15.70
Polish	Slavic	10185 / 201024	5926	929	99	934	942	5.24	91.68	1.79
Portuguese	Romance	4001 / 303996	3668	902	100	872	865	0.01	93.26	3.19
Quechua	Quechuan	1006 / 180004	963	521	93	495	526	1.25	98.92	0.05
Romanian	Romance	4405 / 80266	3351	858	99	854	828	22.40	87.65	4.78
Russian	Slavic	28068 / 473481	8186	974	100	980	980	5.20	79.88	11.33
Scottish Gaelic†	Celtic	73 / 781	—	73	58	36	40	38.03	42.73	4.85
Serbo-Croatian	Slavic	24419 / 840799	6746	964	100	971	954	16.75	89.84	9.64
Slovak	Slavic	1046 / 14796	1046	631	93	622	622	0.48	88.21	1.55
Slovene	Slavic	2535 / 60110	2007	769	100	746	762	1.19	88.90	4.95
Sorani Kurdish	Iranian	274 / 22990	263	197	74	198	199	67.89	94.76	15.21
Spanish	Romance	5460 / 382955	4621	906	99	902	922	11.34	98.43	5.13
Swedish	Germanic	10553 / 78411	6511	962	99	956	962	0.36	81.82	0.79
Turkish	Turkic	3579 / 275460	2934	834	99	852	840	0.22	98.30	0.99
Ukrainian	Slavic	1493 / 20904	1490	722	98	744	729	1.89	84.75	5.19
Urdu	Indo-Aryan	182 / 12572	182	111	55	101	106	8.01	95.93	8.10
Welsh	Celtic	183 / 10641	183	183	76	80	78	1.98	96.90	7.31

Table 3: Total number of lemmata and forms available for sampling, and number of distinct lemmata present in each data condition in Task 1. For almost all languages, these were spread across 10000,1000, and 100 forms in the High, Medium, and Low conditions, respectively, and 1000 forms in each Dev and Test set. For †-marked languages, there was not enough total data to support these numbers. Bengali had 4423 forms in the High condition, and Dev and Test sets of 100 forms each. Haida had 6840 forms in the High condition and Dev and Test sets of 100 forms. Scottish Gaelic had no High condition, a Medium condition of 681 forms, and Dev and Test sets of 50 forms each. The three last columns indicate how many inflected forms have undergone changes in a prefix (Pr), a change in a suffix (Su), or a stem-internal change (Ap) versus the given lemma form.

Language Name	ADJ	N	V
Albanian	–	10-20	123
Arabic	40-48	12-36	61-115
Armenian	17-34	17-34	154-155
Basque	–	–	112-810
Bengali	–	9-12	51
Bulgarian	30	4-8	–
Catalan	–	–	50-53
Czech	25-35	14	30
Danish	–	6	8
Dutch	3-9	–	16
English	–	–	7
Estonian	–	30	79
Faroese	17	8-16	12
Finnish	28	13-28	141
French	–	–	49
Georgian	19	19	–
German	–	4-8	29
Haida	–	–	41-176
Hebrew	–	30	23-28
Hindi	–	–	219
Hungarian	–	17-34	–
Icelandic	–	8-16	28
Irish	13	7-13	65
Italian	–	–	47-51
Khaling	–	–	45-382
Kurmanji Kurdish	1-2	1-14	83
Latin	18-31	8-12	99
Latvian	20-24	7-14	49-50
Lithuanian	28-76	7-14	63
Lower Sorbian	33	18	21
Macedonian	16	5-11	20-29
Navajo	–	8	6-50
Northern Sami	13	13	45-54
Norwegian Bokmål	2-5	1-3	3-9
Norwegian Nynorsk	1-5	1-3	8
Persian	–	–	140
Polish	28	7-14	47
Portuguese	–	–	74-76
Quechua	256	256	41
Romanian	8-16	5-6	37
Russian	26-30	6-14	15-16
Scottish Gaelic	12	–	8
Serbo-Croatian	1-43	2-14	63
Slovak	27	6-12	–
Slovene	53	6-18	22
Sorani Kurdish	1-15	1-28	95-186
Spanish	–	–	70
Swedish	5-15	4-8	11
Turkish	72	12-108	120
Ukrainian	26	7-14	17-24
Urdu	–	6	219
Welsh	–	–	20-65

Table 4: Quantity of data available in sub-task 2. For each possible part of speech in each language, we present the range in the number of forms that comprise a paradigm as an indication of the difficulty of the task of forming a full paradigm. These ranges were computed using the data in the Train Medium condition.

shared task.

5.1 Alignment

For each (lemma, feature bundle, inflected form) triple in training data, the system initially aligns the lemma with the inflected form by finding the minimum-cost edit path. Costs are computed with a weighted scheme such that substitutions have a slightly higher cost (1.1) than insertions or deletions (1.0). For example, the German training data pair `schielen-geschielt` 'to squint' (going from the lemma to the past participle) is aligned as:

```
--schielen
geschielt-
```

The system now assumes that each aligned pair can be broken up into a prefix, stem and a suffix, based on where the inputs or outputs have initial or trailing blanks after alignment. We assume that initial or trailing blanks in either input or output reflect boundaries between a prefix and a stem, or a stem and a suffix. This allows us to divide each training example into three parts. Using the example above, the pairs would be aligned as follows, after padding the edges with `$`-symbols:

prefix	stem	suffix
$	schiele	n$
$ge	schielt	$

5.2 Inflection Rules

From this alignment, the system extracts a prefix-changing rule based on the prefix pairing, as well as a set of suffix-changing rules based on suffixes of the stem+suffix pairing. The example alignment above yields the eight extracted suffix-modifying rules

```
n$ → $           ielen$ → ielt$
en$ → t$         hielen$ → hielt$
len$ → lt$       chielen$ → chielt$
elen$ → elt$     schielen$ → schielt$
```

as well as the prefix-modifying rule `$ → $ge`.

Since these rules were obtained from the triple (`schielen`, V;V.PTCP;PST, `geschielt`), they are associated with a token of the feature bundle V;V.PTCP;PST.

5.3 Generation

At test time, to inflect a lemma with features, the baseline system applies rules associated with

Team	Institute(s)	System Description Paper
CLUZH	University of Zurich	Makarov et al. (2017)
CMU	Carnegie Mellon University	Zhou and Neubig (2017a)
CU	University of Colorado Boulder	Silfverberg et al. (2017)
EHU	University of the Basque Country	Alegria and Etxeberria (2016)*
IIT (BHU)	Birla Institute of Technology and Science /	Sudhakar and Singh (2017)
	Indian Institute of Technology (BHU) Varanasi	
ISI	Indian Statistical Institute	Chakrabarty and Garain (2017)
LMU	Ludwig-Maximilian University of Munich	Kann and Schütze (2017)
SU-RUG	Stockholm University / University of Groningen	Östling and Bjerva (2017)
UA	University of Alberta	Nicolai et al. (2017)
UE-LMU	University of Edinburgh /	Bergmanis et al. (2017)
	Ludwig-Maximilian University of Munich	
UF	University of Florida	Zhu et al. (2017)
UTNII	National Institute of Informatics /	Senuma and Aizawa (2017)
	University of Tokyo	

Table 5: The teams' abbreviations as well as their members' institutes and the accompanying system description paper are listed here. Note that in the main text the abbreviations are used with a integer index, indicating the specific submission. One team (marked ∗), did not submit a system description.

training tokens of the precise feature bundle. There is no generalization across bundles that share features.

Specifically, the longest-matching suffix rule associated with the feature bundle is consulted and applied to the input form. Ties are broken by frequency, in favor of the rule that has occurred most often with this feature bundle. After this, the prefix rule that occurred most often with the bundle is likewise applied. That is, the prefix-matching rule has no longest-match preference, while the suffix-matching rule does.

For example, to inflect `kaufen` 'to buy' with the features V;V.PTCP;PST, using the single example above as training data, we would find that the longest matching stored suffix-rule is `en$` → `t$`, which would transform `kaufen` into an intermediate form `kauft`, after which the most frequent prefix-rule, `$` → `$ge` would produce the final output `gekauft`. If no rules have been associated with a particular feature bundle (as often happens in the low data condition), the inflected form is simply taken to be a copy of the lemma.

In sub-task 2, paradigm completion, the baseline system simply repeats the sub-task 1 method and generates all the missing forms independently from the lemma. It does not take advantage of the other forms that are presented in the partially filled paradigm.

In addition to the above, the baseline system uses a heuristic to place a language into one of two categories: largely prefixing or largely suffixing. Some languages, such as Navajo, are largely prefixing and have more complex changes in the left periphery of the input rather than at the right. However, in the method described above, the operation of the prefix rules is more restricted than that of the suffix rules: prefix rules tend to perform no change at all, or insert or delete a prefix. For largely prefixing languages, the method performs better when operating with reversed strings. Classifying a language into prefixing or suffixing is done by simply counting how often there is a prefix change vs. suffix change in going from the lemma form to the inflected form in the training data. Whenever a language is found to be largely prefixing, the system works with reversed strings throughout to allow more expressive changes in the left edge of the input.

6 System Descriptions

The CoNLL-SIGMORPHON 2017 shared task received submissions from 11 teams with members from 15 universities and institutes (Table 5). Many of the teams submitted more than one system, yielding a total of 25 unique systems entered including the baseline system.

In contrast to the 2016 shared task, all but one of the submitted systems included a neural component. Despite the relative uniformity of the sub-

	Neural	Hard	Rerank	Data+
baseline	✗	✓	✗	✗
CLUZH	✓	✓	✗	✗
CMU	✓	✗	✗	✓
CU	✓	✗	✗	✓
EHU	✗	✓	✗	✗
IIT (BHU)	✓	✗	✗	✓
ISI	✓	✗	✓	✗
LMU	✓	✗	✗	✓
SU-RUG	✓	✗	✗	✗
UA	✓	✓	✓	✓
UE-LMU	✓	✗	✗	✓
UF	✓	✗	✗	✗
UTNII	✓	✗	✗	✗

Table 6: Features of the various submitted systems.

mitted architectures, we still observed large differences in the individual performances. Rather than differences in architecture, a major difference this year was the various methods for supplying the neural network with auxiliary training data. For ease of presentation, we break down the systems into the features of their system (see Table 6) and discuss the systems that had those features. In all cases, further details of the methods can be found in the system description papers, which are cited in Table 5.

Neural Parameterization. All systems except for the EHU team employed some form of a neural network. Moreover, all teams except for SU-RUG, which employed a convolutional neural network, made use of some form of gated recurrent network—either a gated recurrent network (GRU) (Chung et al., 2014) or long short-term memory (LSTM) (Hochreiter and Schmidhuber, 1997). In these neural models, a common strategy was to feed in the morphological tag of the form to be predicted along with the input into the network, where each subtag was its own symbol.

Hard Alignment versus Soft Attention. Another axis, along which the systems differ is the use of hard alignment, over soft attention. The neural attention mechanism was introduced in Bahdanau et al. (2015) for neural machine translation (NMT). In short, these mechanisms avoid the necessity of encoding the input word into a fixed length vector, by allowing the decoder to attend to different parts of the inputs. Just as in NMT, the attention mechanism has led to large gains in mor-

phological inflection. The CMU, CU, IIT (BHU), LMU, UE-LMU, UF and UTNII systems all employed such mechanisms.

An alternative to soft attention is hard, monotonic alignment, i.e., a neural parameterization of a traditional finite-state transduction system. These systems enforce a monotonic alignment between source and target forms. In the 2016 shared task (see Cotterell et al., 2016a, Table 6) such a system placed second (Aharoni et al., 2016), and this year's winning system—CLUZH—was an extension of that one. (See, also, Aharoni and Goldberg (2017) for a further explication of the technique and Rastogi et al. (2016) for discussion of a related neural parameterization of a weighted finite-state machine.) Their system allows for explicit biasing towards a copy action that appears useful in the low-resource setting. Despite its neural parameterization, the CLUZH system is most closely related to the systems of UA and EHU, which train weighted finite-state transducers, albeit with a log-linear parameterization.

Reranking. Reranking the output of a weaker system was a tack taken by two systems: ISI and UA. The ISI system started with a heuristically induced candidate set, using the edit tree approach described by Chrupała et al. (2008), and then chose the best edit tree. This approach is effectively a neuralized version of the lemmatizer proposed in Müller et al. (2015) and, indeed, was originally intended for that task (Chakrabarty et al., 2017). The UA team, following their 2016 submission, proposed a linear reranking on top of the k-best output of their transduction system.

Data Augmentation. Many teams made use of auxiliary training data—unlabeled or synthetic forms. Some teams leveraged the provided Wikipedia corpora (see §3). The UE-LMU team used these unlabeled corpora to bias their methods towards copying by transducing an unlabeled word to itself. The same team also explored a similar setup that instead learned to transduce *random* strings to themselves, and found that using random strings worked almost as well as words that appeared in unlabeled corpora. CMU used a variational autoencoder and treated the tags of unannotated words in the Wikipedia corpus as latent variables (see Zhou and Neubig (2017b) for more details). Other teams attempted to get silver-standard labels for the unlabeled corpora. For example,

	High	Medium	Low
UE-LMU-1	**95.32/0.10**	81.02/0.41	—/—
CLUZH-7	95.12/0.10	**82.80/0.34**	**50.61/1.29**
CLUZH-6	95.12/0.10	**82.80/0.34**	**50.61/1.29**
CLUZH-2	94.95/0.10	81.80/0.37	46.82/1.38
LMU-2	94.70/0.11	82.64/0.35	46.59/1.56
LMU-1	94.70/0.11	82.64/0.35	45.29/1.62
CLUZH-5	94.69/0.11	81.00/0.39	48.24/1.48
CLUZH-1	94.47/0.12	80.88/0.39	45.99/1.43
SU-RUG-1	93.56/0.14	—/—	—/—
CU-1	92.97/0.17	77.60/0.50	45.74/1.62
UTNII-1	91.46/0.17	65.06/0.73	1.28/5.71
CLUZH-4	89.53/0.23	80.33/0.41	48.53/1.52
IIT(BHU)-1	89.38/0.22	50.73/1.69	13.88/4.54
CLUZH-3	89.10/0.24	79.57/0.44	47.95/1.55
UF-1	87.33/0.27	68.82/0.78	27.46/2.70
CMU-1†	86.56/0.28	68.00/0.86‡	—/—
ISI-1	74.01/0.78	54.47/1.39	26.00/2.43
EHU-1	64.38/0.72‡	38.50/1.70‡	3.50/3.23‡
UE-LMU-2†	—/—	82.37/0.39	—/—
IIT(BHU)-2	—/—	55.46/1.78	14.27/4.33
UA-3†	—/—	—/—	57.70/1.34‡
UA-4†	—/—	—/—	57.52/1.36‡
UA-1	—/—	—/—	54.22/1.66‡
UA-2	—/—	—/—	42.85/2.23‡
baseline	77.81/0.50	64.70/0.90	37.90/2.15
oracle-fc	99.99/*	97.76/*	70.84/*
oracle-e	98.25/*	92.10/*	64.56/*

Table 7: Sub-task 1 results: Per-form accuracy (in %age points) and average Levenshtein distance from the correct form (in characters), averaged across the 52 languages with all languages weighted equally. The columns represent the different training size conditions. Systems marked with † used external resources. Accuracies marked with ‡ indicate that the submission did not include all 52 languages and should not be compared to the other accuracies.

	High	Medium	Low
LMU-2	**88.52/0.22**	**82.02/0.38**	**67.76/0.75**
LMU-1	87.40/0.24	77.02/0.47	54.74/1.22
CU-1	67.77/0.75	60.94/1.03	47.89/1.67
baseline	76.87/0.51	65.84/0.83	50.14/1.28
oracle-e	94.11/*	88.70/*	75.84/*

Table 8: Sub-task 2 results: Per-form accuracy (in %age points) and average Levenshtein distance from the correct form (in characters).

the UA team trained a tagger on the given training examples, and then tagged the corpus with the goal to obtain additional instances, while the UE-LMU team used a series of unsupervised heuristics. The CU team—which did not make use of external resources—hallucinated more training data by identifying suffix and prefix changes in the given training pairs and then using that information to create new artificial training pairs. The LMU submission also experimented with handwritten rules to artificially generate more data. It seems likely that the primary difference in the performance of the various neural systems lay in these strategies for the creation of new data to train the parameters, rather than in the neural architectures themselves.

7 Performance of the Systems

Relative system performance is described in Tables 7 and 8, which show the average per-language accuracy of each system by resource condition, for each of the sub-tasks. The table reflects the fact that some teams submitted more than one system (e.g. LMU-1 & LMU-2 in the table). Learning curves for each language across conditions are shown in Table 9, which indicates the best per-form accuracy achieved by a submitted system. Full results can be found in Appendix A, including full-paradigm accuracy.

Three teams exploited external resources in some form: UA, CMU, and UE-LMU. In general, any relative performance gained was minimal. The CMU system was outranked by several systems that avoided external resource use in the High and Medium conditions in which it competed. UE-LMU only submitted a system that used additional resources in the Medium condition, and saw gains of ∼%1 compared to their basic system, while it was still outranked overall by CLUZH. In the Low condition, UA saw gains of ∼%3 using external data. However, all UA submissions were limited to a small handful of languages.

All but one of the systems submitted were neural. As expected given the results from SIGMORPHON 2016, these systems perform very well when in the High training condition where data is relatively plentiful. In the Low and Medium conditions, however, standard encoder-decoder architectures perform worse than the baseline using only the training data provided. Teams that beat the baseline succeeded by biasing networks towards the correct solutions through pre-training on synthetic data designed to capture the overall inflectional patterns in a language. As seen in Table 9, these techniques worked better for some languages than for others. Languages with smaller, more regular paradigms were handled well (e.g., English sub-task 1 low-resource accuracy was at

| | Sub-task 1 | | | Sub-task 2 | | |
	High	Medium	Low	High	Medium	Low
Albanian	99.00(UE-LMU)	89.40(CU-1)	31.00(CU-1)	98.35(LMU-2)	88.81(LMU-1)	66.63(LMU-2)
Arabic	94.50(CLUZH-7)	79.70(LMU-2)	37.00(CLUZH-7)	95.48(LMU-2)	90.21(LMU-2)	80.43(LMU-2)
Armenian	97.50(UE-LMU)	91.50(LMU-2)	58.70(CLUZH-7)	98.78(LMU-2)	97.77(LMU-2)	93.92(LMU-2)
Basque	100.00(UTNII-1)	89.00(UE-LMU)	20.00(LMU-2)	—	94.14(LMU-2)	93.02(LMU-2)
Bengali	100.00(UE-LMU)	99.00(CLUZH-1)	68.00(CLUZH-3)	92.61(LMU-1)	91.72(LMU-2)	90.19(LMU-2)
Bulgarian	98.10(UE-LMU)	82.50(LMU-2)	57.10(CU-1)	85.93(LMU-2)	55.95(LMU-2)	49.58(LMU-2)
Catalan	98.40(CLUZH-1)	92.60(CLUZH-7)	66.40(CU-1)	99.35(LMU-2)	97.06(LMU-2)	94.16(baseline)
Czech	94.10(UE-LMU)	86.30(CU-1)	44.00(CLUZH-7)	86.00(LMU-1)	58.61(LMU-2)	34.96(LMU-2)
Danish	94.50(UE-LMU)	83.60(LMU-2)	75.50(CLUZH-7)	75.74(LMU-2)	71.15(baseline)	53.11(CU-1)
Dutch	96.90(UE-LMU)	86.50(LMU-2)	53.60(baseline)	89.30(LMU-2)	86.53(LMU-2)	56.64(LMU-2)
English	97.20(UE-LMU)	94.70(LMU-2)	90.60(UA-1)	91.60(baseline)	84.00(baseline)	84.40(CU-1)
Estonian	98.90(UE-LMU)	82.40(UE-LMU)	32.90(CLUZH-7)	97.90(LMU-2)	92.43(LMU-2)	77.42(LMU-2)
Faroese	87.80(CLUZH-7)	68.10(CLUZH-7)	42.40(CLUZH-7)	71.90(LMU-2)	68.31(LMU-2)	57.55(LMU-2)
Finnish	95.10(UE-LMU)	78.40(UE-LMU)	19.70(CLUZH-7)	93.67(LMU-2)	89.48(LMU-2)	76.30(LMU-2)
French	89.50(UE-LMU)	80.30(CLUZH-7)	66.00(CLUZH-7)	98.83(LMU-2)	95.38(LMU-2)	87.45(LMU-2)
Georgian	99.40(LMU-2)	93.40(CLUZH-7)	85.60(LMU-2)	96.20(LMU-2)	89.67(LMU-2)	86.82(LMU-2)
German	93.00(UE-LMU)	80.00(CLUZH-4)	68.10(CLUZH-4)	85.88(LMU-2)	77.56(LMU-2)	74.66(LMU-2)
Haida	99.00(UTNII-1)	95.00(LMU-2)	46.00(LMU-2)	—	96.40(LMU-2)	95.24(LMU-2)
Hebrew	99.50(LMU-2)	83.80(LMU-2)	35.40(CU-1)	93.42(LMU-2)	85.59(LMU-2)	68.06(LMU-2)
Hindi	100.00(UTNII-1)	97.40(CLUZH-3)	75.50(LMU-2)	99.95(LMU-2)	95.01(LMU-2)	93.84(LMU-2)
Hungarian	86.80(CLUZH-7)	75.10(CLUZH-4)	38.10(CLUZH-7)	89.04(LMU-2)	79.97(LMU-2)	54.50(LMU-2)
Icelandic	92.10(CLUZH-7)	74.70(CLUZH-7)	40.80(CU-1)	74.30(LMU-1)	67.21(LMU-2)	56.57(LMU-2)
Irish	92.10(CLUZH-7)	72.60(CLUZH-7)	37.80(CLUZH-7)	69.53(LMU-2)	52.92(LMU-2)	43.43(LMU-2)
Italian	97.90(UE-LMU)	93.30(UE-LMU)	56.40(CU-1)	97.05(LMU-2)	90.67(LMU-2)	72.00(LMU-2)
Khaling	99.50(UE-LMU)	87.10(LMU-2)	18.00(LMU-2)	99.73(LMU-2)	98.62(LMU-2)	97.15(LMU-2)
Kurmanji	94.80(UE-LMU)	92.80(CLUZH-7)	86.60(CLUZH-2)	94.26(LMU-2)	88.87(LMU-2)	80.17(LMU-2)
Latin	81.30(UE-LMU)	51.80(CLUZH-7)	19.30(CU-1)	87.70(LMU-2)	84.63(LMU-2)	51.98(LMU-2)
Latvian	97.30(UE-LMU)	88.60(CLUZH-7)	68.10(CLUZH-4)	96.69(LMU-2)	89.19(LMU-2)	75.79(LMU-2)
Lithuanian	95.80(UE-LMU)	62.60(UE-LMU)	23.30(baseline)	85.82(LMU-2)	82.87(LMU-2)	49.51(LMU-2)
Lower Sorbian	97.50(UE-LMU)	84.10(UE-LMU)	52.30(CU-1)	87.39(LMU-2)	84.02(LMU-2)	56.43(LMU-2)
Macedonian	97.30(UE-LMU)	91.80(CLUZH-1)	65.50(CLUZH-7)	97.14(LMU-2)	88.98(LMU-2)	60.23(LMU-2)
Navajo	92.30(UE-LMU)	50.80(CLUZH-7)	20.40(CLUZH-7)	58.22(LMU-2)	47.12(LMU-2)	35.48(LMU-2)
Northern Sami	98.60(UE-LMU)	74.00(UE-LMU)	18.70(CU-1)	91.56(LMU-2)	83.51(LMU-2)	39.86(LMU-2)
Norwegian Bokmål	92.60(CLUZH-2)	84.40(UE-LMU)	78.00(CLUZH-7)	70.44(CU-1)	57.23(CU-1)	49.06(CU-1)
Norwegian Nynorsk	92.80(CLUZH-1)	65.60(LMU-2)	54.60(CLUZH-7)	64.42(baseline)	60.74(baseline)	42.33(baseline)
Persian	99.90(LMU-2)	91.90(UE-LMU)	51.00(CLUZH-7)	100.00(LMU-2)	99.56(LMU-2)	99.20(LMU-2)
Polish	92.80(UE-LMU)	79.90(CLUZH-7)	47.90(CLUZH-7)	90.27(baseline)	82.71(LMU-2)	64.53(LMU-2)
Portuguese	99.30(LMU-2)	95.00(LMU-2)	73.30(CLUZH-7)	98.84(LMU-1)	98.58(LMU-2)	96.94(LMU-2)
Quechua	100.00(CLUZH-4)	98.30(CLUZH-7)	61.10(CLUZH-7)	99.84(LMU-2)	99.60(LMU-2)	99.98(LMU-2)
Romanian	89.10(UE-LMU)	77.40(CU-1)	46.30(CLUZH-7)	78.99(baseline)	76.63(LMU-2)	25.00(LMU-2)
Russian	92.80(CLUZH-2)	84.10(CLUZH-2)	52.30(CLUZH-7)	87.42(CU-1)	85.74(LMU-2)	46.17(LMU-2)
Scottish Gaelic	—	90.00(UE-LMU)	64.00(CLUZH-3)	—	51.82(LMU-1)	50.61(LMU-2)
Serbo-Croatian	93.80(CLUZH-2)	83.30(CU-1)	39.20(CU-1)	88.29(LMU-2)	59.18(LMU-2)	40.46(LMU-2)
Slovak	95.30(CLUZH-2)	80.50(CLUZH-7)	53.60(CLUZH-7)	71.84(LMU-2)	66.67(LMU-2)	53.65(LMU-2)
Slovene	97.10(CLUZH-5)	88.80(LMU-2)	63.00(CLUZH-7)	93.71(LMU-1)	85.10(LMU-2)	79.28(LMU-2)
Sorani	89.40(CLUZH-7)	82.90(LMU-2)	27.10(CU-1)	86.39(LMU-2)	86.05(LMU-2)	57.65(LMU-2)
Spanish	97.50(CLUZH-7)	91.70(UE-LMU)	66.40(CLUZH-7)	98.53(LMU-2)	97.89(LMU-2)	91.05(LMU-2)
Swedish	93.10(UE-LMU)	79.70(UE-LMU)	64.20(CLUZH-3)	84.71(LMU-2)	70.88(LMU-2)	51.18(LMU-2)
Turkish	98.40(UE-LMU)	89.70(UE-LMU)	42.00(CLUZH-7)	99.41(LMU-2)	98.65(LMU-2)	87.65(LMU-2)
Ukrainian	95.00(UE-LMU)	82.50(CLUZH-7)	50.40(CU-1)	74.76(LMU-1)	67.14(baseline)	49.21(LMU-2)
Urdu	99.70(UE-LMU)	98.00(CLUZH-4)	74.10(CLUZH-7)	98.44(LMU-1)	94.29(LMU-2)	88.53(LMU-2)
Welsh	99.00(CLUZH-1)	93.00(LMU-2)	56.00(CLUZH-7)	97.96(LMU-2)	97.80(LMU-2)	89.89(LMU-2)

Table 9: Best per-form accuracy (and corresponding system) by language.

90%). Languages with more complex systems, like Latin, proved more challenging (the best system achieved only 19% accuracy in the low condition). For these languages, it is possible that the relevant variation required to learn a best per-form inflectional pattern was simply not present in the limited training data, and that a language-specific learning bias was required.

Even though the top-ranked systems do well on their own, different systems may contain some amount of complementary information, so that an ensemble over multiple approaches has a chance to improve accuracy. We present an upper bound on the possible performance of such an ensemble. Table 7 and Table 8 include an "Ensemble Oracle" system (oracle-e) that gives the correct answer if *any* of the submitted systems is correct. The oracle performs significantly better than any one system in both the Medium (∼10%) and Low (∼15%) conditions. This suggests that the different strategies used by teams to "bias" their systems in an effort to make up for sparse data lead to substantially different generalization patterns.

For sub-task 1, we also present a second "Feature Combination" Oracle (oracle-fc) that gives the correct answer for a given test triple iff its feature bundle appeared in training (with any lemma). Thus, oracle-fc provides an upper bound on the performance of systems that treat a feature bundle such as V;SBJV;FUT;3;PL as atomic. In the low-data condition, this upper bound was only 71%, meaning that 29% of the test bundles had never been seen in training data. Nonetheless, systems should be able to make some accurate predictions on this 29% by decomposing each test bundle into individual morphological features such as FUT (future) and PL (plural), and generalizing from training examples that involve those features. For example, a particular feature or sub-bundle might be realized as a particular affix. Several of the systems treated each individual feature as a separate input to the recurrent network, in order to enable this type of generalization. In the medium data condition for some languages, these systems sometimes far surpassed oracle-fc. The most notable example of this is Basque, where oracle-fc produced a 47% accuracy while six of the submitted systems produced an accuracy of 85% or above. Basque is an extreme example with very large paradigms for the verbs that inflect in the language (only a few dozen common ones do). This

result demonstrates the ability of the neural systems to generalize and correctly inflect according to unseen feature combinations.

8 Future Directions

As regards morphological inflection, there is a plethora of future directions to consider. First, one might consider morphological transductions over pronunciations, rather than spellings. This is more challenging in the many languages (including English) where the orthography does not reflect the phonological changes that accompany morphological processes such as affixation. Orthography usually also does not reflect predictable allophonic distinctions in pronunciation (Sampson, 1985), which one might attempt to predict, such as the difference in aspiration of /t/ in English [tʰɑp] (top) vs. [stɑp] (stop).

A second future direction involves the effective incorporation of external unannotated monolingual corpora into the state-of-the-art inflection or reinflection systems. The best systems in our competition *did not* make use of external data and those that did make heavy use of such data, e.g., the CMU team, did not see much gain. The best way to use external corpora remains an open question; we surmise that they can be useful, especially in the lower-resource cases. A related line of inquiry is the incorporation of cross-lingual information, which Kann et al. (2017b) did find to be helpful.

A third direction revolves around the efficient elicitation of morphological information (i.e., active learning). In the low-resource section, we asked our participants to find the best approach to generate new forms given existing morphological annotation. However, it remains an open question, which of the cells in a paradigm are best to collect annotation for in the first place. Likely, it is better to collect *diagnostic* forms that are closer to principal parts of the paradigm (Finkel and Stump, 2007; Ackerman et al., 2009; Montermini and Bonami, 2013; Cotterell et al., 2017) as these will contain enough information such that the remaining transformations are largely deterministic. Experimental studies however suggest that speakers also strongly rely on pattern frequencies for inferring unknown forms (Seyfarth et al., 2014). Another interesting direction would therefore also include the organization of data according to plausible real frequency distributions (especially in spoken data)

and exploring possibly varying learning strategies associated with lexical items of various frequencies.

Finally, there is a wide variety of other tasks involving morphology. While some of these have had a shared task, e.g., the parsing of morphologically-rich languages (Tsarfaty et al., 2010) and unsupervised morphological segmentation (Kurimo et al., 2010), many have not, e.g., supervised morphological segmentation and morphological tagging. A key purpose of shared tasks in the NLP community is the preparation and release of standardized data sets for fair comparison among methods. Future shared tasks in other areas of computational morphology would seem in order, giving the overall effectiveness of shared tasks in unifying research objectives in subfields of NLP, and as a starting point for possible cross-over with cognitively-grounded theoretical and quantitative linguistics.

9 Conclusion

The CoNLL-SIGMORPHON shared task provided an evaluation on 52 languages, with large and small datasets, of systems for inflection and paradigm completion—two core tasks in computational morphological learning. On sub-task 1 (inflection), 24 systems were submitted, while on sub-task 2 (paradigm completion), 3 systems were submitted. All but one of the systems used rather similar neural network models, popularized by the SIGMORPHON shared task in 2016.

The results reinforce the conclusions of the 2016 shared task that encoder-decoder architectures perform strongly when training data is plentiful, with exact-match accuracy on held-out forms surpassing 90% on many languages; we note there was a shortage of non-neural systems this year to compare with. In addition, and contrary to common expectation, many participants showed that neural systems can do reasonably well even with small training datasets. A baseline sequence-to-sequence model achieves close to zero accuracy: e.g., Silfverberg et al. (2017) reported that all the team's neural models on the low data condition delivered accuracies in the 0-1% range without data augmentation, and other teams reported similar findings. However, with judicious application of biasing and data augmentation techniques, the best neural systems achieved over 50% exact-match prediction of inflected form strings on 100

examples, and 80% on 1,000 examples, as compared to 38% for a baseline system that learns simple inflectional rules. It is hard to say whether these are "good" results in an absolute sense. An interesting experiment would be to pit the small-data systems against human linguists who do not know the languages, to see whether the systems are able to identify the predictive patterns that humans discover (or miss).

An oracle ensembling of all systems shows that there is still much room for improvement, in particular in low-resource settings. We have released the training, development, and test sets, and expect these datasets to provide a useful benchmark for future research into learning of inflectional morphology and string-to-string transduction.

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A Detailed Results

This section contains detailed results for each submitted system on each language. Systems are ordered by average per-form accuracy for each sub-task and data condition. Three metrics are presented for each system/language combination.

1. Per-Form Accuracy: Percentage of test forms inflected correctly.

2. Levenshtein Distance: Average Levenshtein distance of system-predicted form from gold inflected form.

3. Per-Paradigm Accuracy: Percentage of unique lemmata (paradigms) for which every form was inflected correctly.

Scores in bold include the highest scoring non-oracle system for each language as well as any other systems that did not differ significantly in terms of per-form accuracy according to a sign test ($p >= 0.05$). Scores marked with a † indicate submissions that were significantly better than the feature combination oracle ($p < 0.05$), showing per-feature generalization. Scores marked with ‡ did not differ significantly from the ensemble oracle, suggesting minimal complementary information across systems.

	oracle-fc	oracle-e	UE-LMU-1	CLUZH-7	CLUZH-6	CLUZH-2	LMU-2	LMU-1
Albanian	100.00/*/100.00	99.80/*/99.46	**99.00/0.01/98.37**	97.40/0.08/94.31	97.40/0.08/94.31	96.80/0.10/92.95	97.10/0.09/92.95	97.10/0.09/92.95
Arabic	100.00/*/100.00	97.40/*/97.11	**94.40/0.21/93.50**	94.50/0.22/93.62	94.50/0.22/93.62	93.60/0.26/92.66	93.50/0.22/92.42	93.50/0.22/92.42
Armenian	100.00/*/100.00	98.70/*/98.56	**97.50/0.04/97.23**	97.30/0.06/97.01	97.30/0.06/97.01	96.70/0.07/96.34	97.20/0.06/96.90	97.20/0.06/96.90
Basque	100.00/*/100.00	100.00/*/100.00	**100.00/0.00/100.00‡**	**100.00/0.00/100.00‡**	**100.00/0.00/100.00‡**	**100.00/0.00/100.00‡**	**100.00/0.00/100.00‡**	**100.00/0.00/100.00‡**
Bengali	100.00/*/100.00	100.00/*/100.00	**100.00/0.00/100.00‡**	**99.00/0.05/98.53‡**	**99.00/0.05/98.53‡**	**99.00/0.05/98.53‡**	**99.00/0.05/98.53‡**	**99.00/0.05/98.53‡**
Bulgarian	100.00/*/100.00	99.50/*/99.33	**98.10/0.04/97.45**	97.50/0.05/96.64	97.50/0.05/96.64	97.40/0.05/96.51	97.40/0.05/96.51	97.40/0.05/96.51
Catalan	100.00/*/100.00	99.00/*/98.64	98.20/0.05/97.68	**98.30/0.04/97.82**	**98.30/0.04/97.82**	**98.30/0.04/97.82**	**98.30/0.05/97.68**	**98.30/0.05/97.68**
Czech	100.00/*/100.00	97.60/*/97.18	**94.10/0.10/93.18**	93.40/0.11/92.59	93.40/0.11/92.59	93.70/0.11/92.82	93.40/0.12/92.59	93.40/0.12/92.59
Danish	100.00/*/100.00	97.70/*/97.46	**94.50/0.08/93.99**	93.80/0.10/93.29	93.80/0.10/93.29	93.20/0.10/92.72	93.80/0.10/93.18	93.80/0.10/93.18
Dutch	100.00/*/100.00	98.60/*/98.44	**96.90/0.06/96.66**	96.80/0.07/96.55	96.80/0.07/96.55	96.70/0.06/96.44	96.50/0.07/96.11	96.50/0.07/96.11
English	100.00/*/100.00	98.60/*/98.58	97.20/0.06/97.15	96.80/0.06/96.74	96.80/0.06/96.74	**96.70/0.06/96.64**	**96.90/0.06/96.85**	**96.90/0.06/96.85**
Estonian	100.00/*/100.00	99.40/*/98.96	**98.90/0.04/98.09‡**	98.00/0.06/96.88	98.00/0.06/96.88	97.60/0.07/96.19	98.10/0.06/97.05	98.10/0.06/97.05
Faroese	100.00/*/100.00	95.70/*/95.11	86.90/0.28/85.91	**87.80/0.25/86.93**	**87.80/0.25/86.93**	87.30/0.26/86.36	85.30/0.31/83.98	85.30/0.31/83.98
Finnish	100.00/*/100.00	99.10/*/99.09	95.10/0.12/95.03	93.50/0.11/93.41	93.50/0.11/93.41	93.20/0.12/93.10	**94.80/0.10/94.73**	**94.80/0.10/94.73**
French	100.00/*/100.00	95.20/*/95.33	**89.50/0.20/89.29**	88.90/0.20/88.65	88.90/0.20/88.65	88.90/0.20/88.65	88.20/0.23/87.91	88.20/0.23/87.91
Georgian	100.00/*/100.00	99.70/*/99.66	99.10/0.01/99.08	98.80/0.01/98.74	98.80/0.01/98.74	99.10/0.01/98.97	**99.40/0.01/99.31‡**	**99.40/0.01/99.31‡**
German	100.00/*/100.00	97.40/*/97.30	**93.00/0.12/92.74**	91.20/0.20/90.98	91.20/0.20/90.98	91.00/0.21/90.77	92.00/0.14/91.70	92.00/0.14/91.70
Haida	100.00/*/100.00	100.00/*/100.00	98.00/0.03/94.74‡	**99.00/0.02/97.37‡**	**99.00/0.02/97.37‡**	**99.00/0.02/97.37‡**	**99.00/0.01/97.37‡**	**99.00/0.01/97.37‡**
Hebrew	100.00/*/100.00	99.80/*/99.78	**99.30/0.01/98.68‡**	**99.40/0.01/98.90‡**	**99.40/0.01/98.90‡**	**99.50/0.01/99.12‡**	**99.50/0.01/99.12‡**	**99.50/0.01/99.12‡**
Hindi	100.00/*/100.00	100.00/*/100.00	**100.00/0.00/100.00‡**	**100.00/0.00/100.00‡**	**100.00/0.00/100.00‡**	**100.00/0.00/100.00‡**	**100.00/0.00/100.00‡**	**100.00/0.00/100.00‡**
Hungarian	100.00/*/100.00	93.70/*/93.57	86.40/0.32/86.10	**86.80/0.30/86.51**	**86.80/0.30/86.51**	86.50/0.30/86.20	86.30/0.31/86.10	86.30/0.31/86.10
Icelandic	100.00/*/100.00	96.10/*/95.88	90.20/0.21/89.32	**92.10/0.17/91.43**	**92.10/0.17/91.43**	91.50/0.19/90.88	89.50/0.23/88.54	89.50/0.23/88.54
Irish	100.00/*/100.00	96.80/*/96.64	90.90/0.26/90.03	**92.10/0.26/91.49**	**92.10/0.26/91.49**	91.10/0.28/90.37	91.40/0.27/90.71	91.40/0.27/90.71
Italian	100.00/*/100.00	98.80/*/98.72	**97.90/0.06/97.76**	97.60/0.06/97.44	97.60/0.06/97.44	96.90/0.08/96.69	97.60/0.07/97.44	97.60/0.07/97.44
Khaling	100.00/*/100.00	99.90/*/99.76	**99.50/0.01/98.82‡**	99.30/0.01/98.34	99.30/0.01/98.34	99.20/0.01/98.10	**99.40/0.01/98.58‡**	**99.40/0.01/98.58‡**
Kurmanji	100.00/*/100.00	98.20/*/98.12	**94.80/0.04/94.68**	94.50/0.10/94.36	94.50/0.10/94.36	94.20/0.11/94.05	94.50/0.07/94.47	94.50/0.07/94.47
Latin	100.00/*/100.00	94.80/*/94.71	**81.30/0.42/80.74**	81.00/0.28/80.63	81.00/0.28/80.63	81.10/0.27/80.63	77.60/0.34/77.14	77.60/0.34/77.14
Latvian	100.00/*/100.00	98.90/*/98.81	**97.30/0.04/97.19**	96.50/0.05/96.65	96.50/0.05/96.65	96.40/0.05/96.54	96.80/0.04/96.65	96.80/0.04/96.65
Lithuanian	100.00/*/100.00	98.50/*/97.43	**95.80/0.07/93.43**	94.10/0.09/91.08	94.10/0.09/91.08	93.40/0.10/89.98	91.90/0.13/87.95	91.90/0.13/87.95
Lower Sorbian	100.00/*/100.00	99.50/*/99.21	**97.50/0.04/96.35**	97.00/0.06/95.87	97.00/0.06/95.87	96.80/0.06/95.56	96.90/0.06/95.71	96.90/0.06/95.71
Macedonian	100.00/*/100.00	98.80/*/98.73	**97.30/0.05/97.15**	96.90/0.05/96.83	96.90/0.05/96.83	96.80/0.05/96.72	96.70/0.05/96.51	96.70/0.05/96.51
Navajo	100.00/*/100.00	97.20/*/95.52	**92.30/0.20/89.41**	92.20/0.19/89.82	92.20/0.19/89.82	91.10/0.23/88.39	90.10/0.21/84.73	90.10/0.21/84.73
Northern Sami	100.00/*/100.00	99.20/*/98.92	98.60/0.04/98.25	97.90/0.05/97.45	97.90/0.05/97.45	**98.00/0.05/97.58**	97.60/0.06/97.04	97.60/0.06/97.04
Norwegian Bokmal	99.90/*/99.89	97.80/*/97.74	**92.40/0.13/92.04**	92.60/0.12/92.26	92.60/0.12/92.26	92.60/0.12/92.37	92.30/0.13/92.04	92.30/0.13/92.04
Norwegian Nynorsk	100.00/*/100.00	97.30/*/97.39	90.80/0.16/90.75	**92.50/0.14/92.60**	**92.50/0.14/92.60**	92.40/0.13/92.49	88.30/0.19/88.57	88.30/0.19/88.57
Persian	100.00/*/100.00	100.00/*/100.00	**99.80/0.00/99.25‡**	99.70/0.01/98.88	99.70/0.01/98.88	99.40/0.01/97.75	**99.90/0.00/99.63‡**	**99.90/0.00/99.63‡**
Polish	100.00/*/100.00	96.10/*/95.97	**92.80/0.15/92.46**	92.10/0.16/91.83	92.10/0.16/91.83	92.00/0.18/91.72	91.60/0.22/91.30	91.60/0.22/91.30
Portuguese	100.00/*/100.00	99.40/*/99.42	**99.10/0.02/99.08‡**	99.00/0.02/98.96	99.00/0.02/98.96	99.00/0.02/98.96	**99.30/0.02/99.31‡**	**99.30/0.02/99.31‡**
Quechua	100.00/*/100.00	100.00/*/100.00	**99.90/0.00/99.81‡**	**99.90/0.00/99.81‡**	**99.90/0.00/99.81‡**	**99.90/0.00/99.81‡**	**99.90/0.00/99.81‡**	**99.90/0.00/99.81‡**
Romanian	100.00/*/100.00	94.50/*/93.60	**89.10/0.33/87.32**	87.80/0.36/85.75	87.80/0.36/85.75	87.90/0.33/85.87	88.00/0.39/85.99	88.00/0.39/85.99
Russian	100.00/*/100.00	96.50/*/96.53	91.60/0.21/91.53	**92.10/0.23/92.04**	**92.10/0.23/92.04**	92.80/0.19/92.76	92.10/0.20/92.04	92.10/0.20/92.04
Scottish Gaelic	—	—	—	—	—	—	—	—
Serbo-Croatian	100.00/*/100.00	96.50/*/96.33	**93.50/0.13/93.19**	93.30/0.13/93.08	93.30/0.13/93.08	93.80/0.13/93.50	92.10/0.16/91.72	92.10/0.16/91.72
Slovak	100.00/*/100.00	98.50/*/97.59	94.20/0.10/91.32	**95.30/0.08/93.41**	**95.30/0.08/93.41**	**95.30/0.08/93.41**	94.40/0.09/91.64	94.40/0.09/91.64
Slovene	100.00/*/100.00	98.50/*/98.16	**97.00/0.05/96.72**	96.90/0.06/96.72	96.90/0.06/96.72	96.80/0.06/96.59	97.00/0.06/96.85	97.00/0.06/96.85
Sorani	100.00/*/100.00	98.10/*/92.46	89.30/0.12/65.33	**89.40/0.12/64.32**	**89.40/0.12/64.32**	89.00/0.13/63.82	88.80/0.13/62.31	88.80/0.13/62.31
Spanish	100.00/*/100.00	98.80/*/98.70	**97.30/0.05/97.07**	97.50/0.05/97.29	97.50/0.05/97.29	97.20/0.06/96.96	97.20/0.05/96.96	97.20/0.05/96.96
Swedish	100.00/*/100.00	98.40/*/98.34	**93.10/0.14/93.04**	92.60/0.13/92.41	92.60/0.13/92.41	92.80/0.13/92.62	92.00/0.13/91.79	92.00/0.13/91.79
Turkish	99.70/*/99.64	99.40/*/99.29	**98.40/0.04/98.21**	97.70/0.06/97.62	97.70/0.06/97.62	97.60/0.06/97.38	97.60/0.05/97.38	97.60/0.05/97.38
Ukrainian	100.00/*/100.00	98.60/*/98.08	**95.00/0.09/93.55**	94.60/0.09/93.28	94.60/0.09/93.28	94.40/0.09/93.00	94.30/0.09/93.00	94.30/0.09/93.00
Urdu	100.00/*/100.00	99.90/*/99.06	**99.70/0.01/97.17‡**	**99.60/0.01/96.23‡**	**99.60/0.01/96.23‡**	**99.60/0.01/96.23‡**	**99.60/0.01/96.23‡**	**99.60/0.01/96.23‡**
Welsh	100.00/*/100.00	99.00/*/98.72	**99.00/0.03/98.72‡**	**99.00/0.03/98.72‡**	**99.00/0.03/98.72‡**	**99.00/0.03/98.72‡**	**99.00/0.03/98.72‡**	**99.00/0.03/98.72‡**

Table 10: Sub-task 1 High Condition Part 1.

	CLUZH-5	CLUZH-1	SURUG-1	CU-1	UTNII-1	CLUZH-4	IIT(BHU)-1	CLUZH-3
Albanian	**98.80/0.04/97.02**	97.00/0.09/93.22	97.90/0.07/94.58	97.60/0.06/95.12	98.30/0.03/96.48	92.80/0.33/86.18	95.40/0.13/89.16	92.30/0.34/85.09
Arabic	92.50/0.36/91.34	91.40/0.35/90.01	89.80/0.39/88.21	90.40/0.46/88.81	90.20/0.42/88.69	86.50/0.50/84.60	88.20/0.40/86.28	86.70/0.47/84.48
Armenian	96.00/0.07/95.57	96.50/0.07/96.12	95.60/0.08/95.12	96.30/0.08/95.90	94.10/0.11/93.46	96.00/0.08/95.57	94.00/0.12/93.46	95.30/0.09/94.79
Basque	**100.00/0.00/100.00‡**	**100.00/0.00/100.00‡**	**100.00/0.00/100.00‡**	**100.00/0.00/100.00‡**	**100.00/0.00/100.00‡**	93.00/0.17/77.27	**100.00/0.00/100.00‡**	94.00/0.15/77.27
Bengali	**99.00/0.03/98.53‡**	**99.00/0.03/98.53‡**	**99.00/0.05/98.53‡**	**99.00/0.05/98.53‡**	**99.00/0.05/98.53‡**	**99.00/0.05/98.53‡**	98.00/0.05/97.06‡	**99.00/0.05/98.53‡**
Bulgarian	96.20/0.06/95.03	96.70/0.06/95.56	96.70/0.07/95.56	**97.40/0.06/96.64**	96.40/0.06/95.56	95.40/0.09/94.09	94.30/0.10/92.47	95.70/0.07/94.35
Catalan	**98.30/0.05/97.82**	**98.40/0.04/97.95**	97.80/0.06/97.27	97.60/0.07/96.86	96.40/0.09/95.50	97.10/0.07/96.32	97.20/0.07/96.32	97.10/0.07/96.32
Czech	92.70/0.13/91.76	92.70/0.13/91.76	92.00/0.15/90.94	92.40/0.15/91.53	90.60/0.16/89.18	91.40/0.16/90.47	89.60/0.19/87.88	90.60/0.18/89.53
Danish	**93.90/0.10/93.29**	**93.90/0.10/93.29**	93.80/0.09/93.64	90.50/0.15/89.60	88.40/0.18/87.28	83.30/0.25/81.97	89.20/0.17/88.09	82.60/0.26/81.04
Dutch	95.30/0.10/95.11	**96.50/0.07/96.22**	95.90/0.07/95.44	95.60/0.09/95.22	94.30/0.10/93.66	92.10/0.15/91.77	92.10/0.16/91.32	91.50/0.15/91.10
English	**96.80/0.06/96.74**	**96.80/0.06/96.74**	96.60/0.07/96.64	95.60/0.09/95.52	94.20/0.09/94.10	95.60/0.09/95.52	94.30/0.10/94.20	95.50/0.09/95.42
Estonian	97.90/0.07/97.23	96.00/0.08/94.45	96.80/0.08/94.97	97.10/0.09/95.67	96.30/0.07/94.80	93.10/0.18/90.12	94.80/0.11/92.37	92.20/0.20/88.73
Faroese	**86.90/0.27/85.91**	**86.90/0.27/85.91**	84.80/0.35/84.54	85.40/0.31/83.64	81.40/0.34/80.11	72.40/0.60/71.02	77.80/0.45/76.48	71.10/0.62/69.55
Finnish	93.10/0.13/93.00	91.70/0.14/91.58	91.00/0.17/90.87	**93.80/0.14/93.71**	84.10/0.26/83.98	87.90/0.22/87.73	80.50/0.40/80.43	86.10/0.24/85.90
French	**88.40/0.22/88.12**	**88.40/0.22/88.12**	87.50/0.24/87.17	**88.20/0.23/87.91**	81.10/0.34/80.49	80.50/0.37/80.06	80.30/0.38/79.75	80.10/0.40/79.75
Georgian	**98.80/0.01/98.63**	**98.80/0.01/98.63**	97.60/0.05/97.71	95.40/0.13/96.00	97.40/0.04/97.25	98.10/0.05/98.05	97.50/0.04/97.25	98.00/0.04/97.94
German	**91.50/0.20/91.18**	90.20/0.23/90.04	89.50/0.21/89.11	89.70/0.31/89.42	85.70/0.37/85.37	84.60/0.49/84.23	83.10/0.35/82.57	83.90/0.50/83.51
Haida	**99.00/0.02/97.37‡**	**99.00/0.02/97.37‡**	95.00/0.10/89.47‡	80.00/0.63/57.89	**99.00/0.01/97.37‡**	**99.00/0.02/97.37‡**	**96.00/0.09/89.47‡**	**98.00/0.03/94.74‡**
Hebrew	**99.40/0.01/98.90‡**	**99.40/0.01/98.90‡**	99.00/0.01/98.23	98.50/0.02/97.35	99.00/0.01/98.23	95.40/0.07/91.61	96.70/0.05/94.26	97.00/0.04/94.70
Hindi	**100.00/0.00/100.00‡**	**100.00/0.00/100.00‡**	99.80/0.00/99.22‡	**100.00/0.00/100.00‡**	**100.00/0.00/100.00‡**	**100.00/0.00/100.00‡**	99.30/0.02/97.25	99.80/0.01/99.22‡
Hungarian	**86.30/0.30/86.10**	**86.70/0.30/86.41**	84.80/0.35/84.54	**86.40/0.30/86.10**	79.10/0.44/78.73	82.60/0.36/82.37	80.20/0.41/79.77	81.90/0.38/81.54
Icelandic	**91.20/0.18/90.55**	**91.20/0.18/90.55**	86.30/0.25/85.32	89.10/0.24/88.21	81.30/0.33/80.31	83.50/0.33/82.42	79.70/0.40/78.09	81.40/0.38/80.31
Irish	**91.30/0.28/90.71**	**91.30/0.28/90.71**	87.60/0.35/86.45	88.70/0.37/87.79	83.10/0.43/82.08	86.60/0.45/86.00	67.90/1.05/65.85	86.90/0.41/86.23
Italian	**97.60/0.06/97.44**	**97.00/0.08/96.79**	96.80/0.09/96.58	**97.00/0.09/96.79**	96.00/0.11/95.73	95.40/0.13/95.09	95.30/0.10/95.09	95.70/0.12/95.41
Khaling	**99.00/0.01/97.63**	98.80/0.02/97.39	98.30/0.03/95.97	98.90/0.04/97.39	98.90/0.01/97.39	87.80/0.19/77.01	97.40/0.04/94.31	88.80/0.17/78.44
Kurmanji	**94.00/0.08/93.95**	93.70/0.11/93.53	93.80/0.10/93.63	94.40/0.18/94.26	92.00/0.19/91.75	**94.10/0.08/94.05**	93.50/0.09/93.74	**94.00/0.08/93.95**
Latin	80.30/0.29/79.79	80.30/0.29/79.79	75.30/0.39/74.81	80.50/0.31/80.21	70.90/0.43/70.05	59.70/0.65/59.15	54.50/0.71/53.65	57.00/0.69/56.30
Latvian	96.10/0.06/96.21	96.10/0.06/96.21	95.40/0.08/95.24	94.60/0.13/94.37	92.20/0.13/91.88	94.90/0.08/94.91	92.10/0.17/91.99	94.70/0.09/94.70
Lithuanian	93.40/0.12/90.30	93.40/0.12/90.30	91.00/0.15/86.83	92.90/0.12/89.43	92.90/0.12/89.43	86.00/0.22/80.59	85.20/0.23/79.34	83.10/0.27/75.90
Lower Sorbian	**96.60/0.06/95.40**	**96.60/0.06/95.40**	96.90/0.06/95.56	95.40/0.11/93.81	95.30/0.08/93.81	96.30/0.09/95.24	93.10/0.12/90.32	96.40/0.07/95.40
Macedonian	96.50/0.06/96.41	96.50/0.06/96.41	**96.60/0.06/96.41**	95.20/0.11/94.93	93.40/0.10/93.13	94.60/0.10/94.29	94.60/0.12/94.29	94.40/0.11/94.08
Navajo	89.80/0.28/85.95	88.40/0.28/84.73	88.90/0.28/83.91	83.10/0.46/76.37	85.10/0.30/78.00	59.80/1.24/49.49	85.60/0.33/77.19	59.80/1.24/49.90
Northern Sami	97.60/0.06/96.91	97.50/0.07/96.91	94.50/0.12/92.74	96.10/0.10/95.16	92.60/0.14/90.46	87.40/0.22/84.68	93.60/0.12/91.53	84.50/0.27/81.85
Norwegian Bokmal	91.20/0.14/90.86	91.20/0.14/90.86	**92.40/0.13/92.15**	91.50/0.15/91.29	89.60/0.17/89.35	86.80/0.21/86.24	84.10/0.24/83.23	86.50/0.21/85.91
Norwegian Nynorsk	**92.80/0.13/92.93**	**92.80/0.13/92.93**	89.40/0.18/89.34	87.50/0.23/87.49	81.70/0.30/81.28	69.30/0.53/68.44	73.30/0.45/72.80	67.60/0.58/66.38
Persian	**99.50/0.02/98.50‡**	98.40/0.03/95.51	99.30/0.01/97.75	**99.50/0.01/98.13‡**	**99.60/0.01/98.50‡**	92.40/0.18/81.65	98.90/0.02/96.25	92.20/0.19/80.52
Polish	**91.90/0.18/91.61**	**91.90/0.18/91.61**	90.60/0.22/90.23	90.90/0.27/90.66	88.10/0.27/87.69	90.30/0.21/89.92	82.00/0.50/81.21	89.70/0.20/89.28
Portuguese	**99.00/0.02/98.96‡**	**99.00/0.02/98.96‡**	98.80/0.02/98.73	**99.30/0.02/99.31‡**	97.90/0.03/97.69	98.50/0.03/98.38	98.50/0.03/98.38	98.50/0.03/98.38
Quechua	99.10/0.02/98.48	98.90/0.03/97.91	**100.00/0.00/100.00‡**	90.30/0.19/83.08	**99.60/0.00/99.43‡**	**100.00/0.00/100.00‡**	98.50/0.05/97.15	99.10/0.02/98.48
Romanian	**87.70/0.34/85.63**	**87.70/0.34/85.63**	86.40/0.42/84.06	85.50/0.48/83.82	82.80/0.47/80.31	80.10/0.58/77.42	76.00/0.70/73.31	79.70/0.60/77.05
Russian	92.60/0.21/92.55	92.60/0.21/92.55	89.30/0.31/89.18	90.80/0.28/90.71	86.10/0.31/86.02	90.40/0.28/90.31	82.80/0.47/82.55	90.30/0.29/90.20
Scottish Gaelic	—	—	—	—	—	—	—	—
Serbo-Croatian	**93.30/0.14/92.98**	**93.30/0.14/92.98**	90.10/0.24/89.62	92.10/0.24/91.72	88.80/0.25/88.26	90.80/0.19/90.57	81.00/0.43/80.08	90.10/0.20/89.83
Slovak	**94.50/0.10/92.12**	**94.50/0.10/92.12**	93.10/0.13/90.03	89.30/0.19/84.41	91.70/0.12/87.62	90.10/0.18/85.69	89.50/0.18/85.21	89.10/0.20/84.89
Slovene	**97.10/0.05/96.72**	96.90/0.07/96.59	96.60/0.07/96.19	95.80/0.12/95.01	95.20/0.09/94.75	95.80/0.07/95.01	94.30/0.11/93.31	94.80/0.10/93.70
Sorani	**88.70/0.14/62.81**	**88.70/0.14/62.81**	88.60/0.14/60.80	89.10/0.14/61.81	87.30/0.15/59.80	80.10/0.44/54.77	87.30/0.17/62.31	79.00/0.47/52.76
Spanish	**97.30/0.05/97.07**	97.10/0.07/96.85	93.50/0.15/92.95	96.80/0.07/96.53	95.00/0.10/94.69	94.80/0.09/94.47	94.00/0.13/93.49	95.00/0.09/94.69
Swedish	91.20/0.15/91.06	91.20/0.15/91.06	**91.80/0.13/91.58**	87.60/0.21/87.21	87.50/0.21/87.01	81.80/0.29/81.08	86.70/0.23/86.49	81.60/0.30/80.87
Turkish	97.30/0.07/97.02	97.30/0.07/97.02	96.60/0.11/96.19	96.40/0.09/96.07	93.50/0.27/93.21	96.40/0.07/95.95	96.40/0.07/95.83	97.20/0.07/96.90
Ukrainian	93.10/0.12/91.36	93.10/0.12/91.36	**94.20/0.11/92.73**	90.20/0.21/88.07	90.80/0.15/88.61	90.60/0.16/88.34	87.60/0.22/84.36	89.70/0.17/87.38
Urdu	**99.60/0.01/96.23‡**	**99.60/0.01/96.23‡**	99.70/0.01/97.17‡	98.30/0.03/86.79	**99.60/0.01/96.23‡**	**99.60/0.01/96.23‡**	99.40/0.01/95.28‡	99.50/0.01/95.28‡
Welsh	**99.00/0.04/98.72‡**	**99.00/0.03/98.72‡**	99.00/0.03/98.72‡	98.00/0.04/97.44‡	98.00/0.04/97.44‡	97.00/0.05/96.15‡	99.00/0.03/98.72‡	98.00/0.04/97.44‡

Table 11: Sub-task 1 High Condition Part 2.

	UF-1	CMU-1	baseline	ISI-1	EHU-1
Albanian	92.90/0.17/87.53	91.30/0.13/78.59	78.90/0.66/68.83	79.10/0.95/70.46	—
Arabic	84.90/0.68/82.79	85.90/0.49/83.87	50.70/1.45/50.18	60.20/1.33/59.57	—
Armenian	93.50/0.11/92.90	82.30/0.34/80.93	87.20/0.27/86.14	89.50/0.25/88.91	—
Basque	**96.00/0.12/86.36**‡	**97.00/0.11/90.91**‡	5.00/3.38/4.55	0.00/6.13/0.00	31.00/1.66/9.09
Bengali	**96.00/0.08/94.12**‡	**99.00/0.05/98.53**‡	81.00/0.26/83.82	76.00/0.63/76.47	—
Bulgarian	92.70/0.12/90.46	86.70/0.24/83.20	88.80/0.18/86.83	80.90/0.40/78.49	—
Catalan	93.40/0.14/92.22	96.50/0.09/95.50	95.50/0.11/94.68	92.00/0.21/90.31	—
Czech	87.20/0.23/85.53	81.90/0.32/79.65	89.60/0.22/88.71	83.00/0.34/81.41	—
Danish	88.60/0.23/87.63	85.40/0.23/85.09	87.80/0.21/86.59	82.30/0.26/80.58	—
Dutch	90.80/0.20/90.10	88.90/0.22/88.21	87.00/0.22/86.10	90.20/0.21/89.43	—
English	93.90/0.10/93.79	94.60/0.10/94.51	94.70/0.09/94.61	93.30/0.11/93.18	—
Estonian	94.80/0.12/92.72	93.70/0.15/90.81	78.00/0.39/71.40	75.50/0.78/69.67	—
Faroese	77.00/0.48/75.45	74.50/0.51/72.84	74.10/0.57/73.30	64.30/0.74/62.39	—
Finnish	74.40/0.46/74.24	74.90/0.57/74.54	78.20/0.35/77.99	52.40/2.00/51.93	—
French	79.10/0.41/78.69	82.40/0.33/82.08	81.50/0.36/81.12	80.80/0.43/80.49	—
Georgian	81.60/0.24/80.66	92.30/0.13/91.99	93.80/0.11/93.59	94.40/0.13/95.08	—
German	81.40/0.55/81.02	78.70/0.44/78.22	82.40/0.59/81.95	79.40/0.42/78.84	—
Haida	**97.00/0.06/92.11**‡	**97.00/0.12/92.11**‡	67.00/0.77/50.00	57.00/1.36/39.47	—
Hebrew	93.10/0.09/88.74	97.50/0.03/95.36	54.00/0.56/39.96	71.10/0.53/60.26	77.60/0.28/63.36
Hindi	99.10/0.01/96.47	**99.60/0.01/98.43**‡	93.50/0.09/82.35	99.10/0.01/98.43	—
Hungarian	78.70/0.41/78.42	73.60/0.58/73.34	68.50/0.66/67.95	77.50/0.46/77.07	—
Icelandic	78.00/0.42/76.53	68.10/0.63/66.41	76.30/0.50/75.19	78.20/0.45/77.20	—
Irish	73.10/0.87/70.66	71.90/0.80/69.88	53.00/1.13/52.97	60.60/1.60/60.69	—
Italian	92.40/0.19/92.09	92.60/0.14/92.09	76.90/0.72/76.39	91.10/0.23/90.60	—
Khaling	96.60/0.05/93.36	94.80/0.10/88.63	53.70/0.87/33.18	56.00/1.55/33.89	—
Kurmanji	93.60/0.08/93.32	83.80/0.34/83.40	93.00/0.08/93.01	93.00/0.09/93.11	—
Latin	54.70/0.72/54.39	66.20/0.60/65.71	47.60/0.81/48.25	21.10/2.49/21.90	70.10/0.69/69.42
Latvian	87.40/0.26/86.69	87.50/0.25/86.90	92.10/0.20/91.88	77.90/0.50/76.95	—
Lithuanian	79.20/0.35/70.42	81.60/0.33/73.40	64.20/0.48/53.83	43.50/1.33/31.14	—
Lower Sorbian	94.00/0.12/92.06	91.30/0.14/86.83	86.40/0.25/83.97	85.00/0.29/80.63	—
Macedonian	89.90/0.20/89.43	86.10/0.26/85.41	92.10/0.17/91.75	90.80/0.14/90.49	—
Navajo	68.50/0.85/57.64	84.20/0.34/78.00	37.80/2.12/31.16	23.30/2.68/18.33	—
Northern Sami	88.40/0.22/85.35	85.80/0.33/82.12	64.00/0.73/58.47	28.50/2.26/23.79	76.30/0.56/71.91
Norwegian Bokmal	87.60/0.22/87.10	82.00/0.29/81.40	**91.00/0.17/90.54**	83.60/0.26/83.01	—
Norwegian Nynorsk	80.30/0.34/80.09	73.80/0.49/73.34	76.90/0.41/76.50	66.40/0.57/65.51	73.30/0.48/72.03
Persian	96.30/0.08/89.14	98.70/0.02/95.13	79.00/0.56/61.80	71.30/0.96/51.69	—
Polish	79.50/0.50/78.77	78.10/0.50/77.28	88.00/0.28/87.47	83.40/0.43/82.80	—
Portuguese	92.50/0.11/91.56	96.40/0.06/96.07	98.10/0.04/91.92	96.10/0.07/95.84	—
Quechua	97.10/0.05/94.49	95.50/0.09/92.02	95.40/0.09/94.68	93.10/0.16/92.78	—
Romanian	77.30/0.63/73.91	78.60/0.51/75.48	79.80/0.54/77.17	77.30/0.71/75.00	—
Russian	79.90/0.62/79.59	76.40/0.65/76.33	85.70/0.47/85.51	86.10/0.43/85.92	—
Scottish Gaelic	—	—			—
Serbo-Croatian	78.60/0.46/77.67	79.60/0.41/78.93	84.60/0.32/84.17	77.40/0.63/76.73	—
Slovak	90.60/0.15/86.33	87.90/0.18/81.83	83.30/0.30/78.14	82.40/0.34/76.53	—
Slovene	92.90/0.13/91.86	87.80/0.20/85.17	88.90/0.19/86.48	85.70/0.24/83.20	—
Sorani	85.80/0.20/54.77	**87.80/0.16/59.80**	63.60/0.68/43.72	54.90/1.13/41.71	—
Spanish	86.80/0.26/86.01	92.80/0.12/92.19	90.70/0.21/90.24	88.40/0.36/87.53	—
Swedish	85.50/0.25/85.14	80.60/0.39/80.25	85.40/0.24/84.93	82.70/0.30/82.02	—
Turkish	94.80/0.11/94.17	90.30/0.32/89.40	72.60/0.75/69.29	73.50/0.87/70.48	—
Ukrainian	88.80/0.20/86.15	84.00/0.24/80.66	85.40/0.28/82.44	84.90/0.30/81.34	—
Urdu	**99.40/0.01/94.34**‡	97.90/0.03/81.13	96.50/0.05/84.91	98.20/0.03/84.91	—
Welsh	**98.00/0.04/97.44**‡	**99.00/0.03/98.72**‡	69.00/0.52/65.38	62.00/0.88/57.69	58.00/0.66/52.56

Table 12: Sub-task 1 High Condition Part 3.

	oracle-fc	oracle-e	CLUZH-7	CLUZH-6	LMU-2	LMU-1	UE-LMU-2	CLUZH-2
Albanian	100.00/*/100.00	94.60/*/90.79	**88.00/0.33/77.78**	**88.00/0.33/77.78**	88.70/0.28/79.13	88.70/0.28/79.13	86.10/0.31/74.53	87.00/0.36/76.15
Arabic	99.40/*/99.28	87.90/*/86.28	**79.30/0.64/77.26**	**79.30/0.64/77.26**	79.70/0.66/76.77	79.70/0.66/76.77	**78.00/0.67/75.33**	**78.00/0.67/75.21**
Armenian	97.90/*/97.78	96.50/*/96.23	**91.20/0.16/90.69**	**91.20/0.16/90.69**	91.50/0.15/90.80	91.50/0.15/90.80	90.70/0.22/89.80	90.90/0.17/90.02
Basque	47.00/*/18.18	95.00/*/81.82	**85.00/0.29/54.55†**	**85.00/0.29/54.55†**	87.00/0.28/63.64†	87.00/0.28/63.64†	88.00/0.28/68.18†	83.00/0.38/54.55†
Bengali	100.00/*/100.00	99.00/*/98.53	**99.00/0.05/98.53‡**	**99.00/0.05/98.53‡**	98.00/0.08/97.06‡	98.00/0.08/97.06‡	98.00/0.06/97.06‡	**99.00/0.05/98.53‡**
Bulgarian	100.00/*/100.00	93.30/*/91.67	**82.50/0.28/79.84**	**82.50/0.28/79.84**	82.50/0.28/80.51	82.50/0.28/80.51	80.90/0.31/78.09	81.60/0.28/78.49
Catalan	100.00/*/100.00	96.80/*/95.91	**92.60/0.17/91.27**	**92.60/0.17/91.27**	91.00/0.21/88.81	91.00/0.21/88.81	91.20/0.19/89.50	92.30/0.19/90.86
Czech	98.30/*/98.12	91.90/*/91.18	**85.00/0.30/83.18**	**85.00/0.30/83.18**	82.40/0.32/80.35	82.40/0.32/80.35	81.90/0.38/79.65	83.90/0.32/81.88
Danish	100.00/*/100.00	92.80/*/92.14	**83.00/0.25/81.27**	**83.00/0.25/81.27**	83.60/0.25/81.85	83.60/0.25/81.85	82.80/0.27/81.16	82.50/0.26/80.58
Dutch	100.00/*/100.00	94.50/*/93.99	**85.20/0.23/84.20**	**85.20/0.23/84.20**	86.50/0.21/85.76	86.50/0.21/85.76	85.20/0.31/83.98	84.50/0.24/83.31
English	100.00/*/100.00	97.80/*/97.76	**94.10/0.11/94.00**	**94.10/0.11/94.00**	94.70/0.09/94.61	94.70/0.09/94.61	93.50/0.18/93.39	94.40/0.10/94.30
Estonian	100.00/*/100.00	91.70/*/89.08	**79.10/0.34/74.00**	**79.10/0.34/74.00**	82.20/0.29/77.30	82.20/0.29/77.30	82.40/0.30/77.12	77.00/0.38/71.23
Faroese	100.00/*/100.00	83.10/*/81.93	**68.10/0.64/66.25**	**68.10/0.64/66.25**	67.50/0.61/65.34	67.50/0.61/65.34	66.30/0.66/64.77	67.20/0.67/65.00
Finnish	98.80/*/98.78	91.90/*/91.78	**75.50/0.40/75.25**	**75.50/0.40/75.25**	75.60/0.40/75.35	75.60/0.40/75.35	78.40/0.41/78.19	72.70/0.44/72.41
French	100.00/*/100.00	86.80/*/86.53	**80.30/0.37/79.85**	**80.30/0.37/79.85**	78.60/0.38/78.37	78.60/0.38/78.37	78.00/0.40/77.52	80.10/0.38/79.64
Georgian	95.60/*/95.77	95.70/*/96.00	**93.40/0.15/94.05**	**93.40/0.15/94.05**	92.90/0.16/93.02	92.90/0.16/93.02	93.40/0.22/94.05	93.10/0.16/93.71
German	100.00/*/100.00	88.30/*/87.97	**79.10/0.58/78.53**	**79.10/0.58/78.53**	78.40/0.54/78.01	78.40/0.54/78.01	79.10/0.51/78.53	78.50/0.58/77.90
Haida	100.00/*/100.00	99.00/*/97.37	**93.00/0.14/81.58**	**93.00/0.14/81.58**	95.00/0.06/86.84‡	95.00/0.06/86.84‡	93.00/0.13/81.58	89.00/0.20/73.68
Hebrew	100.00/*/100.00	95.20/*/90.95	**82.30/0.23/70.86**	**82.30/0.23/70.86**	83.80/0.21/71.52	83.80/0.21/71.52	79.90/0.27/66.23	81.50/0.24/70.20
Hindi	99.70/*/98.82	99.20/*/97.65	**97.30/0.03/92.55**	**97.30/0.03/92.55**	97.00/0.04/90.59	97.00/0.04/90.59	96.20/0.05/89.02	96.40/0.04/89.41
Hungarian	98.60/*/98.55	87.30/*/87.03	**74.70/0.47/74.27**	**74.70/0.47/74.27**	74.90/0.49/74.38	74.90/0.49/74.38	73.50/0.59/73.03	73.70/0.50/73.13
Icelandic	100.00/*/100.00	87.80/*/86.99	**74.70/0.51/73.08**	**74.70/0.51/73.08**	71.90/0.55/70.19	71.90/0.55/70.19	72.20/0.57/70.52	73.70/0.52/72.19
Irish	99.10/*/98.99	86.30/*/85.44	**72.60/0.77/71.56**	**72.60/0.77/71.56**	68.30/0.88/66.74	68.30/0.88/66.74	68.10/0.95/66.63	69.30/0.92/68.53
Italian	100.00/*/100.00	96.00/*/95.73	**92.00/0.17/91.77**	**92.00/0.17/91.77**	92.50/0.17/92.41	92.50/0.17/92.41	93.30/0.17/93.16	91.70/0.18/91.45
Khaling	90.90/*/80.33	94.40/*/87.91	**78.50/0.41/60.90**	**78.50/0.41/60.90**	87.10/0.19/74.88	87.10/0.19/74.88	84.00/0.29/71.09	77.70/0.42/60.90
Kurmanji	97.20/*/97.08	96.50/*/96.35	**92.80/0.10/92.69**	**92.80/0.10/92.69**	90.90/0.13/91.34	90.90/0.13/91.34	89.80/0.22/90.19	91.50/0.16/91.65
Latin	100.00/*/100.00	77.70/*/77.67	**51.80/0.80/51.22**	**51.80/0.80/51.22**	49.30/0.86/48.47	49.30/0.86/48.47	48.90/1.09/47.94	50.40/0.82/50.16
Latvian	99.30/*/99.24	93.10/*/92.86	**88.60/0.19/88.20**	**88.60/0.19/88.20**	85.40/0.28/84.74	85.40/0.28/84.74	86.70/0.39/86.26	88.10/0.21/87.77
Lithuanian	98.90/*/98.44	79.80/*/73.87	**62.10/0.54/50.55**	**62.10/0.54/50.55**	61.90/0.58/50.55	61.90/0.58/50.55	62.60/0.58/52.27	60.80/0.57/48.98
Lower Sorbian	100.00/*/100.00	92.90/*/90.79	**83.90/0.31/79.21**	**83.90/0.31/79.21**	83.50/0.30/78.73	83.50/0.30/78.73	84.10/0.30/79.52	83.10/0.33/78.10
Macedonian	98.70/*/98.63	96.20/*/96.09	**91.70/0.15/91.44**	**91.70/0.15/91.44**	91.80/0.13/91.44	91.80/0.13/91.44	89.60/0.21/89.32	91.80/0.16/91.54
Navajo	99.00/*/98.78	67.70/*/57.64	**50.80/1.45/38.90**	**50.80/1.45/38.90**	48.00/1.68/36.05	48.00/1.68/36.05	49.30/1.60/36.66	49.60/1.48/38.09
Northern Sami	100.00/*/100.00	88.10/*/85.35	**70.70/0.56/65.32**	**70.70/0.56/65.32**	70.70/0.57/64.92	70.70/0.57/64.92	74.00/0.54/68.01	67.90/0.61/61.96
Norwegian Bokmal	99.30/*/99.25	93.40/*/93.01	**83.70/0.26/82.90**	**83.70/0.26/82.90**	83.90/0.27/83.01	83.90/0.27/83.01	84.40/0.27/83.55	83.50/0.26/82.69
Norwegian Nynorsk	99.70/*/99.67	86.10/*/85.31	**65.40/0.56/64.20**	**65.40/0.56/64.20**	65.60/0.56/64.31	65.60/0.56/64.31	64.00/0.62/63.00	64.40/0.59/63.22
Persian	100.00/*/100.00	96.30/*/90.26	**87.10/0.23/70.41**	**87.10/0.23/70.41**	90.70/0.14/77.90	90.70/0.14/77.90	91.90/0.14/81.65	85.90/0.27/69.66
Polish	99.70/*/99.68	89.80/*/89.38	**79.90/0.45/79.09**	**79.90/0.45/79.09**	77.30/0.54/76.11	77.30/0.54/76.11	76.40/0.64/75.48	79.00/0.46/78.13
Portuguese	100.00/*/100.00	96.90/*/96.53	**94.50/0.08/93.99**	**94.50/0.08/93.99**	94.50/0.08/94.45	94.50/0.08/94.45	94.10/0.10/93.41	94.50/0.08/94.10
Quechua	86.20/*/79.09	99.80/*/99.62	**98.30/0.04/97.91†**	**98.30/0.04/97.91†**	96.60/0.08/94.11†	96.60/0.08/94.11†	97.20/0.06/95.25†	97.10/0.10/95.63†
Romanian	100.00/*/100.00	87.10/*/85.39	**76.60/0.59/73.67**	**76.60/0.59/73.67**	73.00/0.68/69.57	73.00/0.68/69.57	75.00/0.66/72.10	76.40/0.60/73.31
Russian	99.30/*/99.39	92.10/*/92.04	**83.80/0.39/83.57**	**83.80/0.39/83.57**	79.80/0.56/79.49	79.80/0.56/79.49	79.30/0.60/78.98	84.10/0.39/83.88
Scottish Gaelic	100.00/*/100.00	94.00/*/75.00	**80.00/0.42/77.50**	**80.00/0.42/77.50**	88.00/0.32/87.50‡	88.00/0.32/87.50‡	90.00/0.32/90.00‡	82.00/0.42/80.00
Serbo-Croatian	92.10/*/91.93	92.30/*/91.93	**82.40/0.33/82.08**	**82.40/0.33/82.08**	81.80/0.35/81.03	81.80/0.35/81.03	80.40/0.45/79.56	81.10/0.38/80.50
Slovak	100.00/*/100.00	91.10/*/86.98	**80.50/0.32/73.15**	**80.50/0.32/73.15**	77.60/0.39/69.29	77.60/0.39/69.29	78.70/0.38/69.61	79.50/0.35/71.54
Slovene	99.10/*/98.95	93.10/*/91.99	**87.70/0.22/85.30**	**87.70/0.22/85.30**	88.80/0.22/86.75	88.80/0.22/86.75	87.80/0.32/86.09	87.00/0.24/84.51
Sorani	97.40/*/87.44	91.30/*/70.85	**76.00/0.39/37.69**	**76.00/0.39/37.69**	82.90/0.25/52.76	82.90/0.25/52.76	79.10/0.34/44.72	71.90/0.48/35.18
Spanish	100.00/*/100.00	95.60/*/95.23	**90.80/0.17/90.24**	**90.80/0.17/90.24**	90.80/0.17/90.35	90.80/0.17/90.35	91.30/0.16/90.56	90.80/0.17/90.13
Swedish	100.00/*/100.00	92.90/*/92.62	**79.40/0.34/78.69**	**79.40/0.34/78.69**	79.40/0.35/78.79	79.40/0.35/78.79	79.70/0.36/79.00	78.60/0.35/77.96
Turkish	93.80/*/93.21	94.40/*/93.57	**89.00/0.27/87.38**	**89.00/0.27/87.38**	85.00/0.32/82.98	85.00/0.32/82.98	89.70/0.33/88.69	87.70/0.31/85.95
Ukrainian	99.60/*/99.45	90.90/*/89.44	**82.50/0.33/79.42**	**82.50/0.33/79.42**	78.00/0.46/74.35	78.00/0.46/74.35	77.90/0.48/74.62	81.60/0.35/78.05
Urdu	98.90/*/90.57	99.40/*/94.34	**98.00/0.03/82.08**	**98.00/0.03/82.08**	97.30/0.03/74.53	97.30/0.03/74.53	96.00/0.07/66.04	97.70/0.04/78.30
Welsh	100.00/*/100.00	98.00/*/97.44	**92.00/0.14/89.74**	**92.00/0.14/89.74**	93.00/0.09/91.03‡	93.00/0.09/91.03‡	91.00/0.15/88.46	89.00/0.19/85.90

Table 13: Sub-task 1 Medium Condition Part 1.

	UE-LMU-1	CLUZH-5	CLUZH-1	CLUZH-4	CLUZH-3	CU-1	UF-1	UTNII-1
Albanian	86.40/0.33/74.53	85.30/0.42/72.63	85.30/0.42/72.63	83.70/0.47/73.17	83.90/0.47/72.90	**89.40/0.28/79.95**	64.20/1.18/48.78	61.20/0.88/36.31
Arabic	76.00/0.74/72.92	77.60/0.68/74.85	77.60/0.68/74.85	77.10/0.71/75.33	76.50/0.73/74.85	73.60/0.99/71.24	55.80/1.53/53.19	53.60/1.33/50.06
Armenian	89.70/0.24/88.91	**90.30/0.19/89.91**	89.80/0.18/88.91	**90.30/0.19/89.80**	**90.30/0.19/89.69**	87.50/0.23/86.47	73.50/0.66/72.95	73.20/0.47/71.73
Basque	**89.00/0.28/68.18**†	69.00/0.66/22.73†	69.00/0.66/22.73†	72.00/0.80/36.36†	72.00/0.78/36.36†	66.00/0.87/22.73†	80.00/0.44/31.82†	**81.00/0.32/54.55**†
Bengali	**98.00/0.06/97.06**‡	97.00/0.07/95.59‡	99.00/0.05/98.53‡	98.00/0.06/97.06‡	97.00/0.07/95.59‡	95.00/0.17/92.65‡	93.00/0.12/89.71	95.00/0.12/92.65‡
Bulgarian	**80.80/0.32/78.36**	**81.30/0.28/78.36**	**81.30/0.28/78.36**	80.70/0.31/78.36	80.70/0.30/78.09	79.90/0.33/77.82	63.60/0.89/60.62	65.50/0.60/60.62
Catalan	**91.20/0.19/89.36**	92.20/0.19/90.72	92.20/0.19/90.72	90.00/0.23/87.86	89.20/0.25/86.90	89.50/0.21/87.45	80.60/0.38/76.94	77.20/0.43/72.71
Czech	81.60/0.36/79.53	84.10/0.32/82.12	84.10/0.32/82.12	84.00/0.30/82.12	82.90/0.32/81.06	**86.30/0.26/85.18**	68.10/0.94/65.53	60.30/0.73/57.53
Danish	81.40/0.29/79.77	81.50/0.28/79.42	81.50/0.28/79.42	81.20/0.28/79.19	80.80/0.30/78.73	76.70/0.35/74.80	79.30/0.34/77.23	75.00/0.37/72.95
Dutch	**85.00/0.30/83.98**	83.10/0.31/81.76	83.10/0.31/81.76	80.80/0.28/80.09	80.40/0.28/79.64	74.70/0.42/73.08	69.70/0.72/68.19	73.10/0.43/71.52
English	92.80/0.18/92.68	94.40/0.10/94.30	94.40/0.10/94.30	93.60/0.11/93.49	93.60/0.11/93.49	91.60/0.14/91.45	88.30/0.25/88.10	90.40/0.16/90.34
Estonian	80.30/0.33/74.18	77.00/0.39/70.88	77.00/0.39/70.88	78.70/0.40/74.00	77.40/0.42/72.27	74.00/0.40/67.94	64.60/0.71/59.27	65.80/0.60/59.62
Faroese	**65.90/0.68/64.20**	66.10/0.71/64.55	66.70/0.69/64.43	**67.10/0.67/65.45**	66.10/0.71/64.55	64.60/0.74/62.95	52.00/0.97/49.89	39.00/1.23/36.70
Finnish	**76.80/0.44/76.47**	71.60/0.46/71.30	71.60/0.46/71.30	71.60/0.50/71.30	70.20/0.55/69.88	67.20/0.72/67.04	37.30/1.98/37.42	51.20/0.94/50.71
French	77.90/0.42/77.31	78.50/0.47/77.84	78.50/0.47/77.84	77.90/0.40/77.73	76.90/0.41/76.67	77.80/0.40/77.52	67.50/0.72/67.13	68.00/0.56/67.66
Georgian	**93.00/0.21/93.48**	93.10/0.16/93.59	93.10/0.16/93.59	93.00/0.19/93.48	92.90/0.19/93.36	92.50/0.24/93.14	78.60/0.47/77.57	88.50/0.36/88.90
German	77.50/0.57/76.97	77.30/0.60/76.76	77.30/0.60/76.76	77.00/0.55/79.46	78.80/0.56/78.22	74.60/0.75/74.07	72.80/0.76/72.10	60.90/0.92/60.37
Haida	**94.00/0.13/84.21**‡	88.00/0.24/71.05	88.00/0.24/71.05	93.00/0.16/81.58	92.00/0.18/78.95	68.00/0.80/50.00	81.00/0.66/52.63	**88.00/0.24/73.68**
Hebrew	80.90/0.26/67.77	80.60/0.25/68.87	80.60/0.25/68.87	75.10/0.34/61.15	75.00/0.34/61.15	77.80/0.28/64.90	67.70/0.48/52.32	67.30/0.45/50.55
Hindi	96.20/0.04/88.63	97.40/0.04/92.16	96.10/0.04/87.84	97.30/0.04/92.16	97.40/0.04/92.16	93.30/0.14/82.35	86.80/0.35/61.18	81.90/0.41/55.29
Hungarian	70.20/0.60/69.71	74.80/0.48/74.38	73.60/0.49/73.13	75.10/0.46/74.69	74.80/0.48/74.38	56.20/0.86/55.60	66.50/0.65/66.29	52.80/0.94/52.59
Icelandic	67.50/0.66/65.29	73.40/0.52/71.97	73.40/0.52/71.97	73.00/0.55/71.19	72.50/0.56/70.86	67.10/0.67/65.29	57.90/0.85/56.17	41.20/1.20/38.71
Irish	65.40/1.03/64.39	71.20/0.85/70.21	71.20/0.85/70.21	**71.20/0.85/70.21**	**71.20/0.85/70.21**	57.00/1.14/55.99	35.40/2.47/34.71	31.90/1.92/30.46
Italian	92.10/0.18/91.88	91.60/0.19/91.35	91.60/0.19/91.35	91.00/0.19/90.81	90.80/0.20/90.60	85.90/0.26/85.47	69.10/0.99/68.38	86.10/0.27/85.47
Khaling	82.90/0.35/68.48	75.80/0.45/58.53	75.80/0.45/58.53	68.10/0.56/48.34	67.80/0.57/47.87	82.90/0.30/68.25	79.20/0.35/65.64	69.30/0.53/49.05
Kurmanji	89.00/0.22/89.25	91.60/0.14/91.65	90.50/0.17/90.61	**92.50/0.12/92.59**	91.60/0.14/91.65	91.10/0.20/91.23	86.30/0.45/87.68	76.20/0.58/76.72
Latin	43.00/1.20/42.12	49.30/0.84/48.89	49.30/0.84/48.89	49.90/0.85/48.25	47.60/0.92/46.96	46.10/0.97/46.24	30.90/1.30/30.79	30.70/1.44/29.74
Latvian	86.30/0.43/86.04	87.60/0.22/87.23	87.60/0.22/87.23	87.40/0.24/86.90	87.30/0.24/86.80	86.00/0.56/85.71	73.10/0.78/72.51	61.90/0.85/61.47
Lithuanian	**61.40/0.65/49.61**	60.30/0.60/48.36	60.30/0.60/48.36	59.40/0.64/48.04	57.10/0.68/44.91	58.40/0.67/45.85	49.20/0.94/35.99	38.70/1.25/27.70
Lower Sorbian	82.00/0.32/75.71	82.50/0.34/76.98	82.90/0.33/77.94	82.80/0.34/77.46	82.50/0.34/76.98	**83.60/0.31/78.25**	73.50/0.48/66.83	59.10/0.69/47.78
Macedonian	89.10/0.20/88.79	91.80/0.17/91.54	91.80/0.17/91.54	90.90/0.17/90.59	90.70/0.17/90.38	90.40/0.18/90.06	78.30/0.39/77.59	76.20/0.39/75.26
Navajo	46.40/1.71/33.60	48.80/1.49/37.47	48.80/1.49/37.47	39.90/2.02/29.33	39.90/2.01/29.33	40.50/2.16/30.14	28.90/2.46/17.31	31.80/2.05/23.22
Northern Sami	68.90/0.61/62.50	64.50/0.67/58.33	64.50/0.67/58.33	63.30/0.74/56.45	60.60/0.80/53.23	57.00/0.91/50.94	50.40/1.01/43.68	34.40/1.56/28.23
Norwegian Bokmal	**84.10/0.28/83.33**	83.70/0.25/82.90	83.50/0.26/82.69	83.10/0.28/82.26	**83.70/0.25/82.90**	80.80/0.32/80.00	80.60/0.37/79.78	76.70/0.38/75.59
Norwegian Nynorsk	61.50/0.65/59.96	64.00/0.59/62.79	64.00/0.59/62.79	64.40/0.58/63.33	63.30/0.61/62.35	62.50/0.65/61.92	58.80/0.70/57.34	55.70/0.77/54.95
Persian	90.30/0.19/76.78	85.80/0.28/69.66	85.80/0.28/69.66	81.80/0.43/61.05	81.20/0.45/59.93	86.10/0.33/71.54	66.20/1.01/32.96	71.70/0.53/46.82
Polish	73.30/0.72/72.51	79.20/0.46/78.34	79.20/0.46/78.34	79.20/0.46/78.34	77.50/0.52/76.54	**78.00/0.52/77.18**	64.20/1.09/63.06	49.60/1.23/48.73
Portuguese	**94.80/0.09/94.22**	94.50/0.09/94.10	94.50/0.09/94.10	94.30/0.10/93.64	94.10/0.10/93.41	94.70/0.08/94.22	84.30/0.29/83.24	85.50/0.22/84.28
Quechua	**96.80/0.07/94.68**†	96.50/0.36/94.11†	96.10/0.16/93.73†	**97.90/0.11/96.77**†	96.50/0.36/94.11†	88.20/0.25/80.42	90.70/0.29/83.65†	90.20/0.26/83.27†
Romanian	71.50/0.71/68.36	75.70/0.62/72.58	75.70/0.62/72.58	74.80/0.62/71.98	74.80/0.64/72.10	**77.40/0.58/74.64**	57.50/1.37/53.02	46.00/1.26/40.94
Russian	78.10/0.65/77.76	83.50/0.40/83.27	83.50/0.40/83.27	82.00/0.47/81.73	82.10/0.46/81.84	81.90/0.51/81.63	67.70/0.89/67.14	53.10/1.25/52.55
Scottish Gaelic	**86.00/0.38/85.00**‡	80.00/0.44/77.50	80.00/0.44/77.50	78.00/0.48/77.50	66.00/1.18/65.00	74.00/0.66/72.50	78.00/0.54/75.00	**80.00/0.54/77.50**
Serbo-Croatian	79.40/0.46/78.72	82.30/0.35/81.97	80.80/0.38/80.19	82.80/0.34/82.49	82.30/0.35/81.97	83.30/0.32/82.91	59.00/1.41/57.65	41.80/1.17/40.46
Slovak	77.50/0.40/68.49	79.50/0.37/71.86	79.50/0.37/71.86	77.30/0.40/69.45	77.60/0.40/69.94	78.00/0.38/70.42	69.20/0.53/60.77	61.40/0.63/50.48
Slovene	85.30/0.36/83.46	86.70/0.24/83.99	86.70/0.24/83.99	86.70/0.25/84.25	85.50/0.26/83.07	86.30/0.29/83.73	78.80/0.45/75.72	65.80/0.55/59.58
Sorani	76.80/0.38/41.21	70.20/0.51/34.67	70.20/0.51/34.67	65.80/0.70/35.68	65.00/0.70/34.67	71.50/0.52/39.70	60.00/0.75/20.60	58.10/0.85/10.55
Spanish	**91.70/0.15/91.11**	90.60/0.17/89.91	90.60/0.17/89.91	87.90/0.25/87.20	88.20/0.24/87.53	89.50/0.24/88.83	71.20/0.81/69.96	80.30/0.40/79.39
Swedish	79.30/0.36/78.59	77.40/0.37/76.61	76.90/0.38/76.20	79.10/0.34/78.27	77.40/0.37/76.61	76.30/0.51/75.68	74.40/0.46/73.70	68.00/0.55/67.57
Turkish	**88.20/0.31/86.67**	87.80/0.30/86.07	87.80/0.30/86.07	**88.80/0.30/87.74**	88.40/0.29/87.26	66.60/0.98/64.29	83.20/0.54/81.79	60.70/1.06/58.57
Ukrainian	76.60/0.49/72.70	81.50/0.35/78.33	81.50/0.35/78.33	79.80/0.40/75.86	80.10/0.39/76.27	79.70/0.48/76.27	62.80/0.76/57.48	57.20/0.79/51.03
Urdu	95.30/0.10/63.21	97.60/0.03/81.13	97.40/0.04/78.30	98.00/0.03/83.02	97.60/0.03/81.13	96.10/0.05/71.70	90.80/0.23/41.51	89.10/0.29/20.75
Welsh	**88.00/0.19/84.62**	87.00/0.21/85.90	87.00/0.21/85.90	89.00/0.23/87.18	88.00/0.24/85.90	82.00/0.27/80.77	78.00/0.35/73.08	86.00/0.21/82.05

Table 14: Sub-task 1 Medium Condition Part 2.

	baseline	IIT(BHU)-2	ISI-1	IIT(BHU)-1	CMU-1	EHU-1
Albanian	66.30/1.12/55.01	41.50/1.88/26.29	53.90/2.29/35.23	32.20/2.44/18.16	—	—
Arabic	42.10/1.77/41.88	37.60/2.20/33.94	34.60/2.36/33.81	37.60/2.20/33.94	—	—
Armenian	72.70/0.53/70.95	68.10/0.78/67.96	58.20/1.16/57.54	58.40/1.14/58.43	—	—
Basque	2.00/5.57/0.00	66.00/0.75/31.82†	1.00/2.95/0.00	66.00/0.75/31.82†	—	6.00/5.10/0.00
Bengali	76.00/0.33/77.94	91.00/0.19/86.76	53.00/1.28/48.53	91.00/0.19/86.76	—	—
Bulgarian	72.80/0.47/69.22	55.50/0.98/52.02	62.30/0.86/58.06	54.80/1.13/50.27	—	—
Catalan	84.30/0.37/81.31	79.70/0.38/75.85	78.10/0.57/74.35	79.70/0.38/75.85	—	—
Czech	81.50/0.41/79.53	52.90/1.41/50.35	67.60/0.74/64.12	38.60/1.74/35.65	—	—
Danish	78.10/0.35/76.07	0.50/5.53/0.58	76.80/0.35/74.91	69.20/0.47/66.71	—	—
Dutch	73.20/0.41/71.30	74.60/0.44/73.30	60.50/0.64/57.95	66.50/0.62/64.74	—	—
English	90.90/0.16/90.74	0.00/8.74/0.00	91.10/0.13/90.95	87.90/0.20/87.69	—	—
Estonian	62.90/0.77/51.65	45.70/1.63/43.33	34.80/2.05/24.96	39.90/1.68/34.84	—	—
Faroese	60.60/0.85/58.86	40.40/1.20/37.61	52.00/1.00/49.77	0.00/8.13/0.00	—	—
Finnish	43.70/1.24/43.20	21.50/2.75/21.40	20.50/3.59/20.18	15.00/3.21/14.91	—	—
French	72.50/0.51/71.79	69.70/0.61/69.03	73.90/0.65/73.70	63.60/0.77/63.10	—	—
Georgian	92.00/0.20/92.11	87.70/0.32/87.41	91.10/0.24/91.30	87.70/0.32/87.41	—	—
German	72.10/0.72/71.37	57.30/0.93/56.74	62.50/0.81/61.83	30.10/1.49/29.88	—	—
Haida	56.00/1.31/26.32	0.00/17.48/0.00	28.00/4.09/13.16	83.00/0.47/63.16	—	—
Hebrew	37.50/0.98/23.62	65.80/0.51/50.33	46.60/1.13/31.35	55.90/0.69/38.19	—	48.40/0.76/35.76
Hindi	85.90/0.21/55.29	87.40/0.42/60.78	80.60/0.54/50.20	85.20/0.56/57.25	—	—
Hungarian	42.30/1.54/41.29	62.80/0.68/62.24	40.60/1.33/39.73	47.70/1.05/47.51	—	—
Icelandic	60.40/0.85/58.29	41.60/1.16/39.71	53.90/1.01/51.72	0.00/8.09/0.00	—	—
Irish	44.00/1.57/43.45	26.10/3.11/25.42	39.50/2.19/39.08	20.10/3.71/19.26	—	—
Italian	71.60/0.84/70.94	70.30/0.80/69.44	75.70/0.57/75.00	58.50/1.26/57.48	—	—
Khaling	17.90/2.01/8.06	58.20/0.81/35.55	16.40/3.17/7.35	52.20/0.97/29.86	—	—
Kurmanji	89.10/0.19/89.46	19.20/1.72/19.42	88.00/0.26/88.73	81.60/0.62/82.78	—	—
Latin	37.60/1.17/37.99	22.10/1.72/21.90	14.50/2.90/14.92	22.10/1.72/21.90	—	39.70/1.29/39.58
Latvian	85.70/0.25/85.17	60.20/0.88/58.01	62.70/0.83/61.47	57.70/0.95/56.06	—	—
Lithuanian	52.20/0.70/40.06	37.60/1.34/25.20	20.70/2.24/13.15	33.70/1.34/22.54	—	—
Lower Sorbian	70.80/0.57/63.33	69.00/0.52/60.00	69.90/0.66/61.75	0.00/7.01/0.00	—	—
Macedonian	83.60/0.31/82.98	79.10/0.32/78.44	76.00/0.36/74.95	69.30/0.50/68.39	—	—
Navajo	33.50/2.37/25.46	19.30/2.78/11.81	14.40/3.60/9.98	19.90/2.82/12.63	—	—
Northern Sami	37.00/1.42/29.70	40.80/1.26/35.75	11.80/3.29/9.54	34.00/1.64/28.63	—	38.90/1.43/32.80
Norwegian Bokmal	80.70/0.31/79.78	78.30/0.33/77.20	78.00/0.32/76.77	48.70/0.74/47.20	—	—
Norwegian Nynorsk	61.10/0.67/59.74	56.40/0.71/55.06	59.60/0.70/58.22	0.00/8.68/0.00	—	54.00/0.80/52.67
Persian	62.30/1.18/36.33	57.00/1.46/25.84	41.20/2.69/16.85	57.10/1.27/24.34	—	—
Polish	74.00/0.58/73.04	48.40/1.33/46.82	59.70/1.29/58.49	19.60/2.01/18.58	—	—
Portuguese	93.40/0.10/92.72	89.60/0.16/88.67	87.70/0.26/86.47	86.00/0.21/85.09	—	—
Quechua	70.30/1.52/59.89	93.00/0.28/87.83†	36.20/2.35/26.62	93.00/0.28/87.83†	—	—
Romanian	69.40/0.75/65.70	49.00/1.57/44.32	60.90/1.09/57.25	36.90/1.95/32.85	—	—
Russian	75.90/0.62/75.61	66.60/0.83/66.12	69.40/0.77/68.98	39.40/1.37/38.67	—	—
Scottish Gaelic	48.00/0.98/42.50	76.00/0.68/75.00	62.00/0.94/60.00	66.00/1.04/62.50	68.00/0.86/65.00	—
Serbo-Croatian	64.50/0.85/64.15	49.50/1.52/48.53	55.50/1.52/54.61	38.70/1.83/37.32	—	—
Slovak	72.30/0.50/63.83	63.70/0.60/52.41	69.90/0.57/59.00	52.80/0.82/40.68	—	—
Slovene	82.20/0.32/78.35	73.50/0.45/68.50	69.20/0.52/62.07	32.30/1.13/24.54	—	—
Sorani	51.70/1.06/31.66	57.50/0.95/18.09	23.00/2.38/16.58	46.50/1.31/8.54	—	—
Spanish	84.70/0.35/83.84	73.90/0.68/72.23	71.40/0.78/70.17	66.70/0.89/65.62	—	—
Swedish	75.70/0.43/74.95	70.00/0.49/69.13	73.00/0.44/71.93	47.70/1.00/46.78	—	—
Turkish	32.90/2.90/30.00	0.00/12.97/0.00	27.10/2.56/23.69	74.50/0.65/71.67	—	—
Ukrainian	72.80/0.48/68.59	61.50/0.70/55.83	65.20/0.69/59.40	30.80/1.47/23.73	—	—
Urdu	87.50/0.21/36.79	88.00/0.47/33.02	80.20/0.46/27.36	88.00/0.47/33.02	—	—
Welsh	56.00/1.11/50.00	83.00/0.29/80.77	32.00/1.97/29.49	74.00/0.40/69.23	—	44.00/0.80/38.46

Table 15: Sub-task 1 Medium Condition Part 3.

	oracle-fc	oracle-e	CLUZH-7	CLUZH-6	CLUZH-4	CLUZH-5	CLUZH-3	CLUZH-2
Albanian	49.40/*/31.98	41.40/*/27.37	**29.50/2.35/14.09**	**29.50/2.35/14.09**	26.30/2.96/13.55	25.40/2.89/12.20	25.40/2.89/12.20	27.10/2.38/14.09
Arabic	49.40/*/49.22	51.10/*/49.58	**37.00/2.03/34.66**	**37.00/2.03/34.66**	36.70/2.08/35.14	36.60/2.07/35.02	36.60/2.07/35.02	34.00/2.05/32.25
Armenian	53.60/*/53.99	71.60/*/72.06	**58.70/1.21/59.20†**	**58.70/1.21/59.20†**	54.60/1.94/55.88	53.40/2.05/55.10	53.40/2.05/55.10	55.10/1.19/55.65
Basque	8.00/*/0.00	25.00/*/9.09	10.00/4.06/4.55	10.00/4.06/4.55	7.00/4.67/0.00	11.00/4.02/4.55	7.00/4.67/0.00	11.00/4.11/4.55
Bengali	83.00/*/75.00	82.00/*/75.00	66.00/0.61/61.76	66.00/0.61/61.76	67.00/0.65/63.24	**68.00/0.64/64.71**	**68.00/0.64/64.71**	65.00/0.69/52.94
Bulgarian	60.70/*/54.84	70.70/*/66.67	**54.60/0.82/50.13**	**54.60/0.82/50.13**	52.90/0.87/48.52	51.70/0.93/47.31	51.70/0.93/47.31	45.80/0.99/40.99
Catalan	87.40/*/83.90	75.90/*/70.67	**65.30/0.71/58.66**	**65.30/0.71/58.66**	63.10/0.83/56.21	63.10/0.82/56.34	63.10/0.82/56.34	61.70/0.82/54.71
Czech	57.10/*/56.82	62.00/*/59.76	44.00/1.47/41.06	44.00/1.47/41.06	43.60/1.43/40.94	**42.90/1.49/40.71**	**42.90/1.49/40.71**	35.70/1.63/33.53
Danish	97.80/*/97.57	84.00/*/82.43	**75.50/0.37/73.18**	**75.50/0.37/73.18**	73.80/0.39/71.45	74.00/0.40/71.79	74.00/0.40/71.79	73.20/0.43/70.64
Dutch	87.30/*/85.87	69.00/*/67.19	**51.80/0.72/48.83**	**51.80/0.72/48.83**	51.70/0.71/48.61	51.50/0.72/48.61	51.50/0.72/48.61	50.80/0.77/47.94
English	100.00/*/100.00	92.20/*/92.07	89.70/0.15/89.52	89.70/0.15/89.52	89.10/0.16/88.91	**90.40/0.15/90.23**	89.00/0.16/88.81	**90.20/0.15/90.03**
Estonian	70.30/*/64.82	54.70/*/44.71	**32.90/1.59/23.05**	**32.90/1.59/23.05**	30.00/3.04/20.28	28.80/3.10/19.76	28.80/3.10/19.76	28.30/1.80/20.28
Faroese	81.50/*/79.66	57.90/*/55.11	**42.40/1.15/40.00**	**42.40/1.15/40.00**	39.80/1.21/37.50	38.20/1.26/35.57	38.20/1.26/35.57	39.30/1.19/36.70
Finnish	50.60/*/50.81	32.30/*/32.25	**19.70/2.13/19.47**	**19.70/2.13/19.47**	16.40/5.17/16.43	16.10/2.37/15.82	14.20/6.07/14.30	17.50/2.31/17.24
French	96.60/*/96.50	73.70/*/73.06	**66.00/0.65/65.43**	**66.00/0.65/65.43**	65.30/0.68/64.69	64.00/0.81/63.52	64.20/0.70/63.52	**65.50/0.70/65.01**
Georgian	88.80/*/89.02	90.90/*/91.08	83.60/0.37/83.07	83.60/0.37/83.07	81.50/0.50/80.66	80.80/0.52/80.09	79.60/0.41/79.18	81.40/0.64/60.47
German	94.40/*/94.19	81.00/*/80.39	**67.10/0.81/66.18**	**67.10/0.81/66.18**	68.10/0.84/67.12	67.30/0.89/66.49	67.30/0.89/66.49	64.30/0.84/63.49
Haida	41.00/*/18.42	60.00/*/34.21	**44.00/2.61/18.42**	**44.00/2.61/18.42**	37.00/2.57/18.42	39.00/2.96/15.79	37.00/2.57/18.42	**40.00/2.87/15.79**
Hebrew	82.40/*/65.67	55.30/*/37.75	31.90/1.16/18.76	31.90/1.16/18.76	28.30/1.25/16.34	27.50/1.27/15.23	27.50/1.27/15.23	30.30/1.21/15.67
Hindi	37.20/*/8.24	84.00/*/52.16	**73.70/0.96/34.12†**	**73.70/0.96/34.12†**	68.60/1.19/27.45†	69.00/1.04/32.55†	68.60/1.19/27.45†	68.90/1.04/32.55†
Hungarian	86.00/*/86.10	54.50/*/54.15	**38.10/1.28/37.45**	**38.10/1.28/37.45**	35.20/1.38/34.65	**37.20/1.41/36.41**	34.20/1.45/33.51	**36.90/1.39/36.10**
Icelandic	85.30/*/85.54	59.70/*/58.18	**39.40/1.33/37.93**	**39.40/1.33/37.93**	39.60/1.36/38.26	38.80/1.40/37.37	38.80/1.40/37.37	37.50/1.38/35.82
Irish	82.70/*/84.88	50.10/*/50.84	**37.80/2.20/38.07**	**37.80/2.20/38.07**	35.20/2.49/35.61	34.90/2.51/35.27	34.90/2.51/35.27	31.20/2.51/31.24
Italian	81.80/*/80.66	64.00/*/62.61	53.80/1.02/52.35	53.80/1.02/52.35	**54.50/1.04/53.31**	53.00/1.07/51.82	53.00/1.07/51.82	48.40/1.13/47.01
Khaling	22.00/*/6.87	33.80/*/15.17	**17.10/2.41/7.11**	**17.10/2.41/7.11**	12.30/2.59/3.79	**15.50/2.52/5.45**	12.60/2.49/3.55	**15.80/2.53/5.69**
Kurmanji	90.20/*/91.34	88.00/*/89.25	86.50/0.64/88.10	86.50/0.64/88.10	86.30/0.74/88.00	86.30/0.76/88.00	86.30/0.76/88.00	86.60/0.57/87.79
Latin	52.30/*/51.53	29.10/*/30.05	**37.00/1.27/16.00**	18.40/2.30/19.15	16.90/2.48/17.78	16.20/2.37/16.83	16.20/2.37/16.83	15.30/2.51/15.98
Latvian	83.90/*/83.12	76.40/*/75.65	67.60/0.77/66.88	67.60/0.77/66.88	68.10/0.80/67.21	66.40/0.84/65.48	66.40/0.84/65.48	60.10/0.89/59.09
Lithuanian	65.40/*/66.35	32.70/*/24.10	**21.50/1.79/13.46**	**21.50/1.79/13.46**	19.70/2.01/11.42	19.20/2.10/12.21	19.30/2.08/11.27	19.80/2.02/12.52
Lower Sorbian	76.80/*/70.48	69.00/*/57.94	**51.40/0.89/39.37**	**51.40/0.89/39.37**	50.30/0.94/37.78	49.60/0.97/37.62	49.60/0.97/37.62	46.30/0.97/33.81
Macedonian	80.20/*/79.49	82.80/*/82.14	65.50/0.54/64.48	65.50/0.54/64.48	60.50/0.60/59.20	59.70/0.62/58.46	59.70/0.62/58.46	61.40/0.64/60.47
Navajo	92.60/*/88.39	28.00/*/21.38	20.40/3.28/11.81	20.40/3.28/11.81	19.30/3.33/11.41	19.40/3.33/11.41	19.40/3.33/11.41	17.50/3.20/10.39
Northern Sami	69.10/*/61.42	29.90/*/24.33	**17.30/2.34/13.58**	**17.30/2.34/13.58**	14.50/2.68/11.02	14.80/2.66/11.42	15.00/2.64/11.42	16.30/2.59/12.90
Norwegian Bokmal	99.30/*/99.25	88.90/*/88.49	**78.00/0.33/77.20**	**78.00/0.33/77.20**	77.50/0.35/76.56	77.10/0.35/76.24	**77.30/0.35/76.45**	77.10/0.35/76.24
Norwegian Nynorsk	98.60/*/98.48	76.30/*/74.97	**54.60/0.78/53.86**	**54.60/0.78/53.86**	52.80/0.87/52.23	52.80/0.90/52.34	52.80/0.90/52.34	51.20/0.89/49.95
Persian	51.50/*/17.23	65.00/*/35.58	51.00/1.21/19.85	51.00/1.21/19.85	47.50/1.59/16.48	45.30/1.67/14.23	45.30/1.67/14.23	46.00/1.30/16.10
Polish	74.70/*/74.52	62.60/*/61.36	**47.90/1.49/47.03**	**47.90/1.49/47.03**	46.70/2.04/45.86	46.30/2.33/45.75	46.30/2.33/45.75	40.80/1.49/39.92
Portuguese	75.90/*/72.72	78.30/*/75.95	73.30/0.44/70.40	73.30/0.44/70.40	71.70/0.49/68.67	70.50/0.48/67.28	70.50/0.48/67.28	70.20/0.51/67.17
Quechua	23.60/*/16.54	78.40/*/65.78	**61.10/1.38/43.35†**	**61.10/1.38/43.35†**	60.00/1.62/41.83†	60.10/1.61/42.02†	60.10/1.61/42.02†	49.90/1.73/31.94†
Romanian	79.40/*/75.97	60.70/*/55.80	**46.30/1.47/40.10**	**46.30/1.47/40.10**	43.40/1.70/36.96	41.90/1.52/36.84	41.30/1.75/35.02	42.30/1.50/36.96
Russian	77.00/*/76.73	72.60/*/72.24	52.30/1.05/51.84	52.30/1.05/51.84	47.90/1.17/47.35	48.30/1.16/47.86	48.30/1.16/47.86	48.60/1.15/47.96
Scottish Gaelic	92.00/*/90.00	72.00/*/70.00	**64.00/0.98/60.00‡**	**64.00/1.00/60.00‡**	**64.00/0.98/60.00‡**	**64.00/1.06/60.00‡**	**64.00/1.06/60.00‡**	52.00/1.34/52.50
Serbo Croatian	31.90/*/31.76	53.60/*/52.62	34.90/1.77/33.96	34.90/1.77/33.96	28.60/2.10/28.30	28.60/2.13/28.41	28.60/2.13/28.41	33.00/1.79/31.97
Slovak	85.90/*/79.74	74.50/*/64.63	**53.60/0.75/41.00**	**53.60/0.75/41.00**	52.20/0.81/39.07	49.60/0.86/35.53	49.60/0.86/35.53	45.90/0.85/35.37
Slovene	77.00/*/73.88	77.20/*/72.18	63.00/0.60/55.38	63.00/0.60/55.38	62.10/0.63/54.46	**62.40/0.63/54.86**	**62.40/0.63/54.86**	58.10/0.70/50.00
Sorani	38.20/*/18.09	43.20/*/18.59	23.80/2.19/12.56	23.80/2.19/12.56	21.90/2.41/13.07	21.10/2.33/11.06	21.10/2.33/11.06	18.80/2.16/5.53
Spanish	76.90/*/75.49	75.60/*/74.19	**66.40/0.71/65.08**	**66.40/0.71/65.08**	60.40/0.86/59.00	60.00/1.27/58.24	60.50/0.86/58.89	62.60/0.86/61.06
Swedish	97.00/*/96.88	79.60/*/78.79	63.90/0.59/62.58	63.90/0.59/62.58	63.70/0.57/62.37	**64.20/0.56/62.89**	**64.20/0.56/62.89**	61.80/0.63/60.29
Turkish	41.20/*/38.81	54.30/*/51.90	**42.00/1.75/39.52**	**42.00/1.75/39.52**	37.10/1.99/35.00	37.50/1.99/35.60	37.50/1.99/35.60	35.80/1.78/33.33
Ukrainian	91.90/*/92.04	68.00/*/62.55	47.10/1.00/39.92	47.10/1.00/39.92	46.10/1.18/38.55	44.10/1.27/37.59	44.10/1.27/37.59	43.40/1.10/36.63
Urdu	39.00/*/39.62	83.40/*/33.96	**74.10/0.75/28.30†**	**74.10/0.75/28.30†**	72.80/0.82/27.36†	73.00/0.85/29.25†	**73.00/0.85/29.25†**	70.90/0.80/17.92†
Welsh	88.00/*/84.62	80.00/*/76.92	56.00/0.94/50.00	56.00/0.94/50.00	54.00/1.04/46.15	52.00/1.10/44.87	52.00/1.10/44.87	50.00/1.07/47.44

Table 16: Sub-task 1 Low Condition Part 1.

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	LMU-2	CLUZH-1	CU-1	LMU-1	baseline	UF-1	ISI-1	IIT(BHU)-2
Albanian	21.10/4.46/15.18	26.70/2.38/13.82	**31.00/2.33/18.70**	10.20/4.63/7.32	21.10/4.46/15.18	4.50/6.66/4.88	21.60/4.20/12.74	1.40/6.36/2.44
Arabic	27.80/2.56/27.44	33.40/2.06/31.65	29.50/2.38/28.64	27.80/2.56/27.44	21.80/2.97/22.38	1.50/5.41/1.20	12.40/3.38/12.64	0.00/9.76/0.00
Armenian	49.40/1.64/50.22	49.30/1.85/50.67	51.30/1.15/50.89	49.40/1.64/50.22	35.80/2.22/34.92	22.10/2.84/22.28	16.40/2.49/15.63	22.00/2.82/21.95
Basque	**20.00/3.11/4.55**†‡	11.00/4.02/4.55	4.00/5.89/0.00	**20.00/3.11/4.55**†‡	2.00/6.60/0.00	1.00/4.81/0.00	0.00/4.80/0.00	6.00/3.73/0.00
Bengali	**66.00/0.69/58.82**	63.00/0.76/50.00	**60.00/0.89/54.41**	**66.00/0.69/58.82**	50.00/1.24/42.65	23.00/1.98/16.18	23.00/2.22/16.18	28.00/1.72/20.59
Bulgarian	49.20/1.22/43.41	43.80/1.03/38.84	**57.10/0.89/51.75**	49.20/1.22/43.41	30.20/1.74/26.08	20.60/2.89/17.47	24.80/2.03/20.83	13.50/2.78/11.29
Catalan	60.30/0.73/53.62	60.30/0.82/53.48	**66.40/0.76/60.03**	60.30/0.73/53.62	55.90/1.07/48.43	41.10/1.51/34.52	49.00/1.40/42.70	25.20/1.71/20.60
Czech	39.30/1.97/37.18	35.50/1.65/32.82	**41.90/1.61/39.18**	30.00/2.16/27.76	39.30/1.97/37.18	22.70/2.69/21.41	19.90/2.57/17.65	16.10/3.05/14.71
Danish	65.80/0.57/63.12	72.80/0.41/70.29	68.90/0.49/66.59	65.80/0.57/63.12	58.40/0.69/55.49	59.70/0.74/56.88	61.90/0.60/58.61	49.80/0.87/47.17
Dutch	53.60/0.72/51.17	50.90/0.91/48.05	51.90/0.74/48.94	52.40/0.80/49.17	53.60/0.72/51.17	37.60/1.58/35.60	35.90/1.09/32.93	33.80/1.24/31.26
English	88.40/0.19/88.20	**90.40/0.15/90.23**	87.80/0.22/87.59	88.40/0.19/88.20	80.60/0.34/80.26	74.70/0.56/74.57	73.50/0.35/73.25	0.00/8.14/0.00
Estonian	30.10/2.48/25.30	26.70/1.86/19.24	**32.20/1.73/21.66**	30.10/2.48/25.30	21.50/2.60/14.73	16.50/3.37/15.77	8.80/3.42/4.33	6.70/3.93/5.20
Faroese	38.20/1.30/35.57	37.40/1.23/34.77	**41.20/1.25/38.52**	38.20/1.30/35.57	30.00/1.53/27.16	22.10/1.73/19.43	25.70/1.70/23.86	4.50/3.56/3.75
Finnish	15.40/4.07/15.52	16.10/2.37/15.82	15.80/3.15/15.82	13.90/3.87/13.89	15.40/4.07/15.52	7.60/6.29/7.71	6.50/4.46/6.39	1.60/6.53/1.52
French	60.90/0.83/60.34	64.00/0.81/63.52	63.00/0.90/62.25	60.90/0.83/60.34	61.80/0.82/61.29	46.20/1.33/46.02	39.10/1.65/38.18	23.90/1.96/22.91
Georgian	**85.60/0.43/85.24**	81.20/0.41/81.12	81.80/0.45/82.27	**85.60/0.43/85.24**	70.50/0.58/69.34	39.10/1.82/36.73	33.90/1.56/31.69	0.00/7.96/0.00
German	56.80/1.17/56.12	63.90/0.86/62.97	56.60/1.39/55.71	56.80/1.17/56.12	54.30/1.01/53.22	31.50/2.23/30.50	37.30/1.27/36.72	8.80/8.59/0.00
Haida	**46.00/2.30/26.32**	39.00/2.96/15.79	24.00/4.23/7.89	**46.00/2.30/26.32**	32.00/6.62/15.79	7.00/6.31/2.63	19.00/5.63/10.53	25.00/3.10/5.26
Hebrew	**35.00/1.21/19.65**	29.00/1.23/15.23	**35.40/1.16/19.65**	**35.00/1.21/19.65**	24.70/1.32/12.14	18.10/1.73/7.95	15.30/1.99/5.96	7.50/2.15/2.65
Hindi	**75.50/1.26/37.25**†	69.00/1.04/32.55†	65.30/1.05/30.20†	**75.50/1.26/37.25**†	29.10/3.98/5.88	30.60/3.19/5.10	16.50/3.01/1.57	40.80/2.02/14.51
Hungarian	**35.90/1.36/35.37**	37.20/1.41/36.41	16.00/2.45/15.46	**35.90/1.36/35.37**	21.00/2.02/20.33	24.90/1.97/24.17	14.90/2.17/14.32	0.00/11.04/0.00
Icelandic	35.30/1.48/34.15	36.60/1.41/35.04	**40.80/1.37/38.71**	35.30/1.48/34.15	30.30/1.69/28.70	25.30/1.80/24.25	21.90/1.91/20.24	13.30/2.50/12.24
Irish	30.30/2.80/30.01	32.10/2.22/32.14	**41.20/1.61/31.58**	21.50/3.83/21.28	30.30/2.80/30.01	8.60/6.77/8.85	20.50/3.52/20.83	0.00/9.89/0.00
Italian	40.40/1.57/38.78	47.30/1.14/45.94	**56.40/1.07/54.70**	40.40/1.57/38.78	41.10/2.11/39.85	18.10/3.13/17.31	27.20/2.23/26.28	0.00/10.38/0.00
Khaling	**18.00/2.40/7.82**	15.50/2.52/5.45	10.20/3.08/2.84	**18.00/2.40/7.82**	3.10/4.38/0.71	3.20/3.39/1.18	6.10/3.74/1.42	2.80/3.71/0.71
Kurmanji	82.80/0.45/84.03	85.90/0.78/87.37	79.50/0.57/80.58	82.50/0.75/83.92	82.80/0.45/84.03	71.10/1.09/72.23	69.40/0.81/70.46	0.00/7.77/0.00
Latin	16.10/2.84/16.61	13.70/2.53/14.29	19.30/2.48/20.00	15.00/2.61/15.87	16.10/2.84/16.61	7.40/3.33/7.83	8.90/3.15/9.31	6.00/3.49/6.35
Latvian	64.20/0.76/62.88	57.80/1.06/56.93	62.60/1.01/62.01	54.40/1.18/53.03	64.20/0.76/62.88	31.90/2.24/30.30	30.80/1.65/29.00	17.60/2.02/16.99
Lithuanian	**23.00/1.89/15.81**	19.20/2.10/12.21	19.80/2.28/12.52	19.50/2.06/10.80	**23.30/1.88/16.12**	7.90/2.73/4.07	13.70/2.63/7.36	0.00/8.44/0.00
Lower Sorbian	46.00/1.03/34.44	46.50/0.97/34.29	**52.30/0.94/40.32**	46.00/1.03/34.44	33.80/1.21/23.65	33.90/1.42/24.44	26.20/1.69/18.25	19.60/1.72/14.13
Macedonian	**64.30/0.58/63.32**	62.10/0.63/61.21	59.60/0.69/58.14	**64.30/0.58/63.32**	52.10/0.99/50.74	38.40/1.68/37.32	34.90/1.29/33.40	24.40/1.52/23.68
Navajo	**20.00/3.02/14.26**	17.80/3.19/10.39	11.70/4.01/7.94	**20.00/3.02/14.26**	19.00/3.38/12.02	0.30/5.72/0.20	7.90/4.04/4.89	1.20/5.16/0.61
Northern Sami	16.10/2.53/11.83	14.80/2.66/11.42	**18.70/2.58/14.25**	16.10/2.53/11.83	16.20/2.34/12.63	4.90/3.59/3.49	6.00/4.13/4.57	4.00/3.92/2.96
Norwegian Bokmal	72.70/0.43/71.29	77.10/0.35/76.24	73.80/0.42/72.58	72.70/0.43/71.29	67.80/0.50/66.34	73.60/0.53/72.80	56.60/0.69/55.05	62.70/0.53/61.08
Norwegian Nynorsk	50.90/0.89/49.73	50.60/0.89/49.08	50.50/0.94/48.31	50.90/0.89/49.73	49.60/0.95/47.55	45.80/1.02/45.16	43.50/1.06/42.66	32.10/1.23/31.12
Persian	45.30/2.18/14.23	43.10/1.41/12.36	38.30/2.35/11.61	45.30/2.18/14.23	24.50/3.56/3.00	15.90/3.95/2.25	11.30/4.55/1.87	14.10/3.90/2.62
Polish	43.10/1.79/42.25	39.70/1.61/38.96	43.70/1.63/42.57	43.10/1.79/42.25	41.30/1.58/40.23	29.80/2.06/28.98	18.90/2.43/18.25	17.10/2.29/16.45
Portuguese	67.90/0.52/64.74	71.10/0.49/68.09	68.40/0.59/65.20	67.90/0.52/64.74	63.60/0.81/59.88	44.50/1.03/41.62	32.20/1.62/28.21	32.80/1.35/29.71
Quechua	58.10/1.17/41.25†	50.00/1.72/32.13†	30.60/2.53/20.53†	58.10/1.17/41.25†	16.40/6.55/12.74	26.60/2.71/14.83	11.00/4.25/9.13	22.70/2.84/13.69
Romanian	**44.70/1.52/38.89**	41.90/1.52/36.84	43.10/1.73/37.08	37.10/1.98/32.00	**44.80/1.51/39.01**	24.80/2.98/20.17	21.70/2.73/18.24	1.60/4.15/1.57
Russian	45.60/1.18/44.90	43.70/1.23/43.16	45.90/1.37/45.51	38.60/1.60/38.27	45.60/1.18/44.90	29.30/2.07/29.08	23.80/2.06/23.57	17.30/2.46/17.14
Scottish Gaelic	52.00/1.58/47.50	**54.00/1.24/55.00**	56.00/1.30/50.00	52.00/1.58/47.50	44.00/1.10/37.50	44.00/2.14/37.50	42.00/1.52/37.50	8.00/8.32/0.00
Serbo-Croatian	29.90/2.87/29.14	31.40/1.82/30.61	39.20/1.73/38.16†	29.90/2.87/29.14	18.40/2.79/18.34	10.40/3.58/10.06	24.20/2.72/24.00	9.20/3.66/9.01
Slovak	48.50/0.91/34.89	44.30/0.88/34.08	46.70/0.99/34.24	48.50/0.91/34.89	42.40/1.01/29.26	32.40/1.46/22.19	23.60/1.57/14.15	0.00/6.32/0.00
Slovene	52.50/0.83/43.44	58.70/0.69/50.52	52.50/0.83/43.44	52.50/0.83/43.44	49.00/0.83/40.68	39.40/1.36/32.15	32.90/1.30/25.98	0.00/9.89/0.00
Sorani	19.80/2.25/6.53	18.60/2.15/6.03	**27.10/1.96/5.53**	19.80/2.25/6.53	19.30/3.37/14.57	0.10/5.44/0.50	8.60/3.79/7.04	1.40/4.64/0.50
Spanish	57.10/1.28/55.53	60.00/1.27/58.24	63.60/0.86/61.93	55.20/1.01/53.04	57.10/1.28/55.53	37.40/1.94/36.01	35.80/1.99/34.49	22.50/2.51/21.48
Swedish	59.20/0.92/57.90	**62.40/0.60/60.91**	60.40/0.80/59.46	59.20/0.92/57.90	54.20/0.86/52.70	51.70/1.04/50.21	45.50/0.96/44.59	39.40/1.09/38.05
Turkish	31.90/2.44/29.52	35.80/1.77/33.21	19.70/3.31/18.33	31.90/2.44/29.52	14.10/4.54/12.62	18.80/3.22/17.98	7.30/4.04/6.55	0.00/12.65/0.00
Ukrainian	43.60/0.95/37.17	41.00/1.17/34.02	**50.40/1.21/44.17**	39.00/1.38/32.37	43.90/0.95/37.59	25.20/1.81/19.48	31.50/1.44/24.83	13.70/1.87/9.33
Urdu	**73.00/0.88/28.30**†	69.00/0.92/16.04†	64.60/0.89/16.98†	**73.00/0.88/28.30**†	31.70/4.06/23.58	46.90/1.45/7.55†	30.50/2.53/17.92	43.70/1.63/7.55†
Welsh	**50.00/1.10/47.44**	49.00/1.12/47.44	53.00/0.99/48.72	**50.00/1.10/47.44**	22.00/1.65/21.79	28.00/1.83/24.36	22.00/2.30/19.23	17.00/2.47/15.38

Table 17: Sub-task 1 Low Condition Part 2.

	IIT(BHU)-1	UTNII-1	UA-3	UA-4	UA-1	UA-2	EHU-1
Albanian	0.00/10.23/0.00	0.30/7.21/0.54	—	—	—	—	—
Arabic	0.80/5.66/0.96	0.20/6.59/0.12	—	—	—	—	—
Armenian	0.00/9.17/0.00	0.00/6.39/0.00	—	—	—	—	—
Basque	1.00/4.91/0.00	5.00/4.34/0.00	—	—	—	—	—
Bengali	20.00/2.05/11.76	1.00/4.19/0.00	—	—	—	—	—
Bulgarian	11.00/3.05/9.41	0.40/5.69/0.13	—	—	—	—	—
Catalan	24.70/1.76/20.19	0.40/5.54/0.27	—	—	—	—	—
Czech	15.60/3.27/14.24	0.00/7.07/0.00	—	—	—	—	—
Danish	46.10/0.95/42.77	1.20/5.25/0.81	—	—	—	—	—
Dutch	28.20/1.42/26.25	0.50/5.01/0.44	—	—	—	—	—
English	73.00/0.46/72.63	1.10/3.98/1.12	**90.60/0.14/90.44**	**90.30/0.14/90.13**	**90.60/0.14/90.44**	—	—
Estonian	3.50/4.58/2.60	0.10/6.41/0.00	—	—	—	—	—
Faroese	9.30/2.62/7.95	0.20/5.27/0.11	—	—	—	—	—
Finnish	0.70/7.41/0.71	0.00/9.98/0.00	—	—	—	—	—
French	0.00/8.80/0.00	0.10/5.76/0.11	—	—	—	—	—
Georgian	0.00/8.82/0.00	1.20/4.23/1.26	—	—	—	—	—
German	25.60/1.75/25.52	0.30/6.42/0.31	**66.80/0.73/65.87**	**66.20/0.75/65.46**	**66.00/0.72/64.94**	—	—
Haida	7.00/4.89/0.00	1.00/6.76/0.00	—	—	—	—	—
Hebrew	7.00/2.36/1.99	0.60/3.68/0.44	—	—	—	—	1.00/3.15/0.44
Hindi	33.40/2.34/9.02	1.20/5.26/0.00	—	—	—	—	—
Hungarian	0.00/10.07/0.00	0.00/7.62/0.00	—	—	—	—	—
Icelandic	13.00/2.53/12.01	0.60/5.52/0.67	—	—	—	—	—
Irish	0.60/7.26/0.67	0.00/7.95/0.00	—	—	—	—	—
Italian	0.00/10.02/0.00	0.00/7.06/0.00	—	—	—	—	—
Khaling	0.00/7.32/0.00	0.90/4.38/0.24	—	—	—	—	—
Kurmanji	50.20/1.27/50.84	0.20/5.23/0.10	—	—	—	—	—
Latin	0.00/9.44/0.00	0.00/7.29/0.00	—	—	—	—	—
Latvian	16.60/2.18/16.02	0.00/6.57/0.00	—	—	—	—	—
Lithuanian	3.00/3.46/1.56	0.50/6.06/0.31	—	—	—	—	—
Lower Sorbian	17.60/1.82/12.86	1.20/4.48/0.63	—	—	—	—	—
Macedonian	0.00/8.68/0.00	0.20/4.98/0.21	—	—	—	—	—
Navajo	0.40/5.61/0.20	0.70/5.82/0.41	—	—	—	—	—
Northern Sami	2.50/4.12/2.15	0.50/5.86/0.27	—	—	—	—	—
Norwegian Bokmal	52.60/0.71/51.08	0.30/4.91/0.22	—	—	—	—	—
Norwegian Nynorsk	23.90/1.41/22.52	0.70/4.25/0.44	—	—	—	—	—
Persian	10.50/4.17/1.50	0.50/5.84/0.00	29.40/3.59/8.24	29.00/3.63/7.49	4.70/5.26/1.12	28.90/3.61/7.87	—
Polish	12.10/2.59/11.68	0.20/6.47/0.21	45.30/1.42/44.27	**45.90/1.42/44.90**	45.20/1.44/44.16	—	—
Portuguese	0.00/9.31/0.00	1.00/4.53/0.92	—	—	—	—	—
Quechua	0.70/5.34/0.38	0.60/5.56/0.19	—	—	—	—	—
Romanian	5.80/3.85/4.71	0.00/6.37/0.00	—	—	—	—	—
Russian	15.70/2.61/15.71	0.00/7.27/0.00	—	—	—	—	—
Scottish Gaelic	48.00/1.54/42.50	32.00/2.38/25.00	—	—	—	—	—
Serbo-Croatian	4.10/4.55/3.98	0.10/7.04/0.10	—	—	—	—	—
Slovak	12.50/1.75/7.56	0.60/4.65/0.16	—	—	—	—	—
Slovene	21.00/1.54/14.30	2.00/5.03/1.05	—	—	—	—	—
Sorani	0.00/7.64/0.00	0.90/4.72/0.00	—	—	—	—	—
Spanish	20.10/2.72/19.52	0.20/5.71/0.22	56.40/0.84/55.31	56.20/0.85/55.10	**64.60/0.75/62.91**	56.80/0.84/55.75	—
Swedish	40.60/1.08/39.19	0.20/6.13/0.21	—	—	—	—	—
Turkish	0.00/11.45/0.00	0.10/8.44/0.00	—	—	—	—	—
Ukrainian	12.20/2.04/8.23	0.70/4.99/0.27	—	—	—	—	—
Urdu	31.20/2.48/2.83	4.70/4.38/0.94	—	—	—	—	—
Welsh	0.00/8.77/0.00	2.00/4.48/1.28	—	—	—	—	6.00/3.32/5.13

Table 18: Sub-task 1 Low Condition Part 3.

	oracle-fc	oracle-e	LMU-2	LMU-1	baseline	CU-1
Albanian	100.00/*/100.00	98.95/*/92.00	**98.35/0.03/86.00**	**98.35/0.03/86.00**	89.46/0.41/70.00	86.36/0.32/66.00
Arabic	100.00/*/100.00	96.52/*/84.00	**95.48/0.14/82.00**	**95.48/0.14/82.00**	55.67/1.20/24.00	75.54/0.79/56.00
Armenian	100.00/*/100.00	99.44/*/96.00	**98.78/0.04/92.00**	**98.78/0.04/92.00**	86.11/0.33/66.00	92.04/0.11/70.00
Basque	—	—				
Bengali	100.00/*/100.00	96.18/*/32.00	92.48/0.24/24.00	**92.61/0.21/32.00**	87.52/0.24/16.00	21.02/1.25/24.00
Bulgarian	100.00/*/100.00	96.48/*/84.00	**85.93/0.24/56.00**	**85.93/0.24/56.00**	74.37/0.40/68.00	78.39/0.33/60.00
Catalan	100.00/*/100.00	99.72/*/94.00	**99.35/0.01/88.00**	**99.35/0.01/88.00**	96.03/0.07/92.00	90.06/0.17/74.00
Czech	100.00/*/100.00	92.22/*/58.00	85.79/0.25/52.00	86.00/0.27/26.00	85.79/0.25/52.00	68.36/1.24/30.00
Danish	100.00/*/100.00	88.20/*/60.00	**75.74/0.37/44.00**	61.64/0.53/16.00	75.41/0.38/42.00	71.48/0.35/30.00
Dutch	100.00/*/100.00	93.54/*/80.00	**89.30/0.15/66.00**	**89.30/0.15/66.00**	78.04/0.35/60.00	73.06/0.37/52.00
English	100.00/*/100.00	95.20/*/88.00	82.00/0.30/58.00	82.00/0.30/58.00	**91.60/0.15/82.00**	84.00/0.23/68.00
Estonian	100.00/*/100.00	98.20/*/80.00	**97.90/0.05/70.00‡**	**97.90/0.05/70.00‡**	77.07/0.35/54.00	78.29/0.46/34.00
Faroese	100.00/*/100.00	84.90/*/50.00	**71.90/0.54/26.00**	**71.90/0.54/26.00**	70.10/0.58/38.00	65.62/0.71/22.00
Finnish	100.00/*/100.00	94.95/*/76.00	**93.67/0.11/72.00**	**93.67/0.11/72.00**	68.18/0.65/56.00	68.78/0.53/52.00
French	100.00/*/100.00	99.85/*/98.00	**98.83/0.01/90.00**	**98.83/0.01/90.00**	92.63/0.13/88.00	89.48/0.17/78.00
Georgian	100.00/*/100.00	97.98/*/98.00	**96.20/0.05/90.00**	**96.20/0.05/90.00**	90.38/0.24/90.00	89.31/0.23/86.00
German	100.00/*/100.00	90.72/*/72.00	**85.88/0.21/52.00**	**85.88/0.21/52.00**	76.40/0.96/52.00	75.82/1.07/38.00
Haida	—	—				
Hebrew	100.00/*/100.00	97.06/*/82.00	**93.42/0.09/70.00**	**93.42/0.09/70.00**	54.09/0.65/12.00	70.46/0.39/26.00
Hindi	100.00/*/100.00	99.98/*/96.00	**99.95/0.00/92.00‡**	**99.95/0.00/92.00‡**	96.82/0.03/92.00	9.15/3.46/4.00
Hungarian	100.00/*/100.00	90.85/*/68.00	**89.04/0.25/60.00**	**89.04/0.25/60.00**	53.97/1.13/40.00	54.95/1.15/26.00
Icelandic	100.00/*/100.00	88.63/*/64.00	68.98/0.67/22.00	74.30/0.51/28.00	67.36/0.69/34.00	63.22/0.77/20.00
Irish	100.00/*/100.00	81.57/*/38.00	69.53/0.74/12.00	69.53/0.74/12.00	47.99/1.64/10.00	53.28/1.29/12.00
Italian	100.00/*/100.00	97.95/*/86.00	**97.05/0.07/70.00**	**97.05/0.07/70.00**	73.05/0.93/58.00	89.86/0.30/46.00
Khaling	100.00/*/100.00	99.98/*/96.00	**99.73/0.01/90.00**	**99.73/0.01/90.00**	79.08/0.43/58.00	89.64/0.13/58.00
Kurmanji	100.00/*/100.00	98.78/*/88.00	**94.26/0.06/50.00**	**94.26/0.06/50.00**	93.39/0.10/66.00	93.74/0.07/60.00
Latin	100.00/*/100.00	95.02/*/82.00	**87.70/0.28/64.00**	77.75/0.45/44.00	47.58/0.91/32.00	50.51/0.88/16.00
Latvian	100.00/*/100.00	97.69/*/90.00	**96.69/0.10/88.00**	93.08/0.10/70.00	86.46/0.23/80.00	88.47/0.23/80.00
Lithuanian	100.00/*/100.00	94.47/*/62.00	**85.82/0.26/38.00**	85.37/0.27/28.00	60.57/0.56/26.00	64.14/0.59/20.00
Lower Sorbian	100.00/*/100.00	96.13/*/72.00	87.39/0.23/46.00	**85.77/0.27/30.00**	82.27/0.37/60.00	80.15/0.39/46.00
Macedonian	100.00/*/100.00	99.43/*/92.00	**97.14/0.05/86.00**	96.14/0.08/80.00	89.70/0.16/78.00	92.56/0.10/70.00
Navajo	100.00/*/100.00	68.36/*/30.00	**58.22/1.10/18.00**	**58.22/1.10/18.00**	37.81/2.13/20.00	46.30/1.94/18.00
Northern Sami	100.00/*/100.00	96.12/*/70.00	**91.56/0.13/46.00**	**91.56/0.13/46.00**	45.68/1.13/28.00	54.61/0.95/20.00
Norwegian Bokmal	100.00/*/100.00	81.76/*/64.00	**67.92/0.56/50.00**	64.78/0.61/42.00	67.92/0.56/50.00	70.44/0.47/46.00
Norwegian Nynorsk	96.93/*/96.00	79.14/*/72.00	64.42/0.61/56.00	51.53/0.85/30.00	64.42/0.61/56.00	60.74/0.83/52.00
Persian	100.00/*/100.00	100.00/*/100.00	**100.00/0.00/100.00‡**	**100.00/0.00/100.00‡**	76.44/0.61/52.00	25.09/1.69/4.00
Polish	100.00/*/100.00	96.80/*/78.00	**89.24/0.19/56.00**	85.02/0.27/36.00	90.27/0.15/66.00	83.10/0.41/42.00
Portuguese	100.00/*/100.00	99.16/*/96.00	98.61/0.02/94.00	**98.84/0.02/90.00**	96.19/0.06/90.00	36.23/1.31/14.00
Quechua	100.00/*/100.00	99.99/*/98.00	**99.84/0.00/80.00**	**99.84/0.00/80.00**	89.13/0.22/86.00	64.45/1.14/8.00
Romanian	100.00/*/100.00	91.27/*/62.00	**78.25/0.55/36.00**	76.04/0.60/16.00	78.99/0.61/40.00	75.00/0.60/30.00
Russian	100.00/*/100.00	92.33/*/68.00	**85.74/0.21/44.00**	**85.74/0.21/44.00**	85.58/0.28/54.00	87.42/0.21/56.00
Scottish Gaelic	—	—				
Serbo-Croatian	99.88/*/98.00	95.65/*/72.00	**88.29/0.18/50.00**	**88.29/0.18/50.00**	77.66/0.72/70.00	74.40/0.70/54.00
Slovak	100.00/*/100.00	86.10/*/40.00	**71.84/0.47/24.00**	68.09/0.53/8.00	69.16/0.56/26.00	68.27/0.53/14.00
Slovene	100.00/*/100.00	96.86/*/72.00	93.02/0.11/64.00	**93.71/0.10/62.00**	76.48/0.44/64.00	77.18/0.45/48.00
Sorani	99.92/*/96.00	91.80/*/56.00	**86.39/0.16/16.00**	**86.39/0.16/16.00**	72.27/0.54/48.00	8.88/2.20/4.00
Spanish	100.00/*/100.00	99.09/*/96.00	**98.53/0.04/84.00**	**98.53/0.04/84.00**	93.58/0.13/82.00	34.63/1.53/6.00
Swedish	100.00/*/100.00	92.94/*/82.00	**84.71/0.22/70.00**	76.18/0.35/46.00	78.24/0.33/66.00	70.29/0.60/52.00
Turkish	100.00/*/100.00	99.54/*/96.00	**99.41/0.02/90.00‡**	**99.41/0.02/90.00‡**	85.05/0.40/80.00	31.08/2.10/14.00
Ukrainian	100.00/*/100.00	84.76/*/56.00	**73.97/0.65/48.00**	74.76/0.54/20.00	73.97/0.65/48.00	72.54/0.54/32.00
Urdu	100.00/*/100.00	99.72/*/80.00	95.33/0.07/60.00	**98.44/0.03/48.00**	95.33/0.07/60.00	90.79/0.10/32.00
Welsh	100.00/*/100.00	99.19/*/76.00	**97.96/0.02/52.00**	**97.96/0.02/52.00**	85.25/0.22/40.00	81.66/0.27/28.00

Table 19: Sub-task 2 High Condition Part 1.

	oracle-fc	oracle-e	LMU-2	LMU-1	baseline	CU-1
Albanian	100.00/*/100.00	98.25/*/90.00	83.62/0.56/72.00	**88.81/0.24/40.00**	83.87/0.56/74.00	82.17/0.44/54.00
Arabic	100.00/*/100.00	92.59/*/60.00	**90.21/0.29/46.00**	**90.21/0.29/46.00**	54.34/1.34/24.00	63.01/1.05/30.00
Armenian	100.00/*/100.00	98.88/*/92.00	**97.77/0.05/84.00**	**97.77/0.05/84.00**	80.89/0.41/54.00	86.57/0.18/44.00
Basque	77.98/*/60.00	94.27/*/20.00	**94.14/0.10/20.00**†‡	**94.14/0.10/20.00**†‡	4.40/4.03/0.00	7.35/4.03/0.00
Bengali	100.00/*/100.00	95.92/*/32.00	**91.72/0.25/24.00**	80.76/0.48/16.00	85.86/0.27/16.00	19.75/1.31/20.00
Bulgarian	74.20/*/92.00	69.68/*/60.00	**55.95/0.91/28.00**	**55.95/0.91/28.00**	49.58/1.10/46.00	49.25/1.64/38.00
Catalan	100.00/*/100.00	98.97/*/90.00	**97.06/0.05/84.00**	96.92/0.05/78.00	95.33/0.09/88.00	79.69/0.30/54.00
Czech	80.08/*/94.00	66.29/*/48.00	**58.61/1.85/40.00**	56.22/1.31/32.00	56.12/1.89/40.00	46.68/2.58/22.00
Danish	100.00/*/100.00	82.30/*/52.00	70.16/0.55/38.00	34.10/1.23/0.00	**71.15/0.54/44.00**	64.92/0.47/24.00
Dutch	100.00/*/100.00	90.77/*/70.00	**86.53/0.22/62.00**	75.28/0.38/42.00	67.71/0.42/54.00	60.33/0.57/30.00
English	100.00/*/100.00	90.00/*/78.00	**84.00/0.27/68.00**	69.20/0.55/38.00	**84.00/0.27/68.00**	81.60/0.26/64.00
Estonian	100.00/*/100.00	94.70/*/56.00	**92.43/0.15/34.00**	**92.43/0.15/34.00**	60.71/1.03/30.00	61.76/0.78/20.00
Faroese	100.00/*/100.00	79.22/*/36.00	**68.31/0.66/32.00**	61.43/0.69/12.00	59.19/0.91/32.00	53.21/1.05/20.00
Finnish	100.00/*/100.00	94.53/*/68.00	**89.48/0.25/56.00**	**89.48/0.25/56.00**	63.30/0.69/38.00	57.14/0.76/42.00
French	100.00/*/100.00	96.70/*/84.00	**95.38/0.07/76.00**	**95.38/0.07/76.00**	85.16/0.25/76.00	85.67/0.22/68.00
Georgian	93.11/*/98.00	92.52/*/90.00	**89.67/0.34/88.00**	89.31/0.25/78.00	82.42/0.46/82.00	81.00/0.58/80.00
German	100.00/*/100.00	85.49/*/50.00	**77.56/0.37/26.00**	**77.56/0.37/26.00**	70.41/0.99/30.00	68.47/1.95/24.00
Haida	99.86/*/90.00	97.33/*/40.00	**96.40/0.07/20.00**	**96.40/0.07/20.00**	64.53/1.15/10.00	59.63/1.30/0.00
Hebrew	100.00/*/100.00	92.08/*/58.00	**85.59/0.18/36.00**	**85.59/0.18/36.00**	42.70/0.88/6.00	54.89/0.62/16.00
Hindi	100.00/*/100.00	97.29/*/16.00	**95.01/0.12/4.00**	**95.01/0.12/4.00**	71.11/0.53/12.00	61.79/0.96/0.00
Hungarian	92.74/*/96.00	82.62/*/50.00	**79.97/0.49/38.00**	**79.97/0.49/38.00**	45.73/1.59/30.00	39.68/2.65/14.00
Icelandic	100.00/*/100.00	84.05/*/44.00	**67.21/0.71/24.00**	56.28/0.91/8.00	54.51/1.12/28.00	56.57/0.80/16.00
Irish	100.00/*/100.00	71.53/*/16.00	**52.92/1.37/2.00**	**52.92/1.37/2.00**	40.33/1.64/0.00	44.34/1.50/0.00
Italian	100.00/*/100.00	95.90/*/72.00	**90.67/0.20/40.00**	**90.67/0.20/40.00**	71.86/1.00/52.00	77.62/0.57/32.00
Khaling	100.00/*/100.00	99.20/*/66.00	**98.62/0.02/52.00**	**98.62/0.02/52.00**	58.20/0.84/32.00	7.53/2.18/0.00
Kurmanji	99.48/*/98.00	95.65/*/82.00	**88.87/0.18/56.00**	85.91/0.22/42.00	88.35/0.19/52.00	87.48/0.18/48.00
Latin	100.00/*/100.00	92.09/*/66.00	**84.63/0.30/56.00**	57.10/0.90/6.00	39.53/1.12/22.00	38.07/1.23/10.00
Latvian	100.00/*/100.00	92.51/*/78.00	**89.19/0.21/74.00**	82.28/0.31/46.00	79.97/0.37/74.00	81.99/0.36/74.00
Lithuanian	100.00/*/100.00	90.54/*/36.00	**82.87/0.29/16.00**	78.50/0.43/8.00	65.92/0.48/24.00	61.73/0.62/14.00
Lower Sorbian	100.00/*/100.00	90.76/*/54.00	**84.02/0.30/44.00**	79.28/0.37/30.00	65.92/0.81/44.00	71.16/0.74/34.00
Macedonian	100.00/*/100.00	94.56/*/80.00	**88.98/0.15/68.00**	82.12/0.27/48.00	86.41/0.20/62.00	83.12/0.25/64.00
Navajo	100.00/*/100.00	54.25/*/30.00	**47.12/1.56/24.00**	**47.12/1.56/24.00**	33.15/2.48/22.00	32.60/2.81/20.00
Northern Sami	100.00/*/100.00	90.98/*/44.00	**83.51/0.28/34.00**	76.92/0.46/16.00	31.43/1.66/14.00	27.93/2.02/8.00
Norwegian Bokmal	100.00/*/100.00	71.07/*/46.00	50.94/0.83/28.00	25.79/1.40/0.00	**50.94/0.83/28.00**	57.23/0.71/34.00
Norwegian Nynorsk	96.93/*/96.00	69.94/*/60.00	60.74/0.67/52.00	49.08/0.89/38.00	**60.74/0.67/52.00**	56.44/0.79/46.00
Persian	100.00/*/100.00	99.85/*/96.00	**99.56/0.00/88.00**	**99.56/0.00/88.00**	78.29/0.54/60.00	94.47/0.09/68.00
Polish	100.00/*/100.00	91.55/*/54.00	**82.71/0.29/46.00**	72.73/0.52/24.00	80.28/0.34/50.00	79.77/0.36/42.00
Portuguese	100.00/*/100.00	99.00/*/94.00	**98.58/0.02/90.00**	95.16/0.08/56.00	95.29/0.06/84.00	92.10/0.09/54.00
Quechua	100.00/*/100.00	100.00/*/100.00	**99.60/0.02/80.00**	**99.60/0.02/80.00**	91.34/0.17/94.00	0.04/4.47/0.00
Romanian	100.00/*/100.00	84.32/*/42.00	**76.63/0.56/30.00**	60.65/1.09/10.00	61.54/0.83/30.00	60.80/0.97/24.00
Russian	98.77/*/98.00	91.56/*/62.00	**85.74/0.24/48.00**	79.29/0.42/32.00	82.98/0.28/50.00	82.21/0.36/38.00
Scottish Gaelic	100.00/*/100.00	65.59/*/8.00	**48.58/1.00/4.00**	**51.82/1.17/4.00**	41.30/1.09/0.00	44.53/1.23/4.00
Serbo-Croatian	42.51/*/92.00	73.55/*/68.00	**59.18/0.70/30.00**†	**59.18/0.70/30.00**†	36.84/2.38/60.00	36.59/2.41/64.00
Slovak	100.00/*/100.00	78.79/*/20.00	**66.67/0.55/12.00**	49.38/0.81/4.00	59.89/0.70/14.00	59.00/0.73/12.00
Slovene	99.88/*/98.00	92.78/*/74.00	**85.10/0.23/46.00**	81.61/0.27/42.00	67.87/0.65/44.00	69.15/0.69/42.00
Sorani	99.41/*/92.00	90.96/*/56.00	**86.05/0.16/36.00**	**86.05/0.16/36.00**	68.30/0.57/48.00	67.96/0.52/44.00
Spanish	100.00/*/100.00	98.84/*/94.00	**97.89/0.05/66.00**	**97.89/0.05/66.00**	92.18/0.16/84.00	86.53/0.21/58.00
Swedish	100.00/*/100.00	84.71/*/62.00	**70.88/0.41/48.00**	56.76/0.76/20.00	57.35/0.67/42.00	59.41/0.77/28.00
Turkish	100.00/*/100.00	99.70/*/90.00	**98.65/0.03/74.00**	**98.65/0.03/74.00**	73.26/0.88/58.00	76.05/0.57/48.00
Ukrainian	100.00/*/100.00	81.11/*/50.00	67.14/0.71/46.00	60.32/0.74/16.00	**67.14/0.71/46.00**	65.71/0.66/30.00
Urdu	100.00/*/100.00	97.54/*/60.00	**94.29/0.11/28.00**	**94.29/0.11/28.00**	81.02/0.25/40.00	67.23/0.45/32.00
Welsh	100.00/*/100.00	99.10/*/64.00	**97.80/0.03/36.00**	**97.80/0.03/36.00**	82.80/0.27/28.00	79.05/0.31/12.00

Table 20: Sub-task 2 Medium Condition Part 1.

	oracle-fc	oracle-e	LMU-2	LMU-1	baseline	CU-1
Albanian	100.00/*/100.00	72.03/*/30.00	**66.63/0.72/8.00**	2.65/5.54/0.00	12.69/1.96/20.00	12.19/2.17/20.00
Arabic	100.00/*/100.00	84.88/*/40.00	**80.43/0.54/20.00**	**80.43/0.54/20.00**	42.85/1.59/22.00	48.78/1.55/30.00
Armenian	99.95/*/98.00	97.06/*/76.00	**93.92/0.17/58.00**	**93.92/0.17/58.00**	76.18/0.37/38.00	75.47/0.37/34.00
Basque	77.03/*/60.00	93.10/*/20.00	**93.02/0.12/20.00**†‡	**93.02/0.12/20.00**†‡	0.46/4.83/0.00	1.54/3.83/0.00
Bengali	100.00/*/100.00	93.89/*/28.00	**90.19/0.26/20.00**	69.94/0.77/8.00	77.20/0.48/8.00	73.38/0.64/8.00
Bulgarian	74.20/*/92.00	63.99/*/40.00	**49.58/1.29/24.00**	43.38/1.50/12.00	33.50/1.61/24.00	35.51/3.43/28.00
Catalan	100.00/*/100.00	97.43/*/82.00	94.07/0.11/80.00	86.83/0.24/18.00	**94.16/0.11/80.00**	90.06/0.18/58.00
Czech	53.32/*/74.00	48.24/*/16.00	**34.96/2.20/12.00**	30.71/1.79/6.00	26.56/2.30/12.00	16.39/4.71/10.00
Danish	88.52/*/90.00	60.66/*/26.00	42.30/1.22/16.00	24.26/1.76/4.00	41.31/1.23/16.00	**53.11/1.74/20.00**
Dutch	100.00/*/100.00	68.82/*/34.00	**56.64/0.55/32.00**	46.13/1.04/4.00	50.18/0.62/24.00	45.57/0.89/16.00
English	100.00/*/100.00	90.00/*/78.00	76.40/0.33/60.00	53.60/0.70/24.00	76.40/0.33/60.00	**84.40/0.21/62.00**
Estonian	100.00/*/100.00	87.37/*/44.00	**77.42/0.49/14.00**	**77.42/0.49/14.00**	39.81/2.12/12.00	50.17/1.08/12.00
Faroese	100.00/*/100.00	64.72/*/22.00	**57.55/0.89/20.00**	17.79/1.81/0.00	49.78/1.04/20.00	46.79/1.13/12.00
Finnish	86.31/*/94.00	85.12/*/56.00	**76.30/1.06/38.00**	69.20/1.01/8.00	60.82/1.37/46.00	54.58/2.47/40.00
French	100.00/*/100.00	93.34/*/78.00	**87.45/0.27/22.00**	**87.45/0.27/22.00**	87.09/0.22/78.00	84.10/0.27/70.00
Georgian	91.21/*/96.00	92.16/*/88.00	**86.82/0.41/86.00**	80.64/0.38/52.00	78.86/0.53/78.00	78.86/1.10/74.00
German	100.00/*/100.00	83.56/*/42.00	**74.66/0.90/32.00**	59.77/0.70/4.00	69.83/0.96/34.00	68.28/1.25/30.00
Haida	99.86/*/90.00	96.25/*/10.00	**95.24/0.12/10.00**	9.59/5.63/0.00	47.15/1.11/0.00	45.85/1.56/0.00
Hebrew	100.00/*/100.00	75.80/*/22.00	**68.06/0.44/10.00**	**68.06/0.44/10.00**	33.27/1.01/0.00	28.83/1.18/4.00
Hindi	100.00/*/100.00	95.34/*/12.00	**93.84/0.19/0.00**	**93.84/0.19/0.00**	64.49/0.72/12.00	63.62/0.97/0.00
Hungarian	92.74/*/96.00	57.60/*/18.00	**54.50/1.12/8.00**	**54.50/1.12/8.00**	17.91/2.53/10.00	11.56/3.11/10.00
Icelandic	100.00/*/100.00	68.98/*/26.00	**56.57/0.91/18.00**	32.35/1.46/0.00	45.79/1.25/24.00	51.40/1.11/20.00
Irish	85.04/*/92.00	56.57/*/10.00	**43.43/1.68/2.00**	34.67/2.27/0.00	35.95/2.22/6.00	26.46/3.49/8.00
Italian	100.00/*/100.00	79.14/*/60.00	**72.00/1.03/38.00**	70.81/0.66/22.00	66.95/1.75/22.00	58.29/1.79/28.00
Khaling	100.00/*/100.00	97.79/*/44.00	**97.15/0.05/24.00**	**97.15/0.05/24.00**	42.30/1.02/16.00	39.16/1.39/8.00
Kurmanji	88.52/*/80.00	86.96/*/64.00	**80.17/0.55/26.00**	62.43/0.68/16.00	78.43/0.58/14.00	65.04/2.02/6.00
Latin	88.29/*/98.00	55.78/*/20.00	**51.98/1.27/16.00**	12.30/2.20/0.00	24.45/2.14/16.00	22.55/3.10/14.00
Latvian	99.86/*/98.00	83.00/*/64.00	**75.79/0.46/52.00**	47.26/1.51/12.00	68.88/0.54/50.00	74.78/0.56/36.00
Lithuanian	100.00/*/100.00	71.81/*/20.00	**49.51/0.89/10.00**	47.99/1.32/0.00	38.27/1.04/8.00	28.19/1.43/2.00
Lower Sorbian	100.00/*/100.00	72.28/*/22.00	**56.43/0.63/16.00**	56.05/0.82/2.00	38.20/0.92/18.00	27.22/1.55/14.00
Macedonian	91.99/*/86.00	66.67/*/32.00	**60.23/0.63/32.00**	41.06/1.01/6.00	42.49/0.97/20.00	14.74/2.05/12.00
Navajo	100.00/*/100.00	45.34/*/26.00	**35.48/2.54/22.00**	27.40/2.10/2.00	26.58/3.08/16.00	19.73/4.08/12.00
Northern Sami	90.40/*/74.00	43.45/*/24.00	**39.86/2.09/24.00**	19.88/2.29/0.00	15.62/2.85/2.00	15.32/3.03/2.00
Norwegian Bokmal	96.23/*/92.00	64.15/*/40.00	**41.51/1.06/24.00**	31.45/1.70/8.00	41.51/1.06/24.00	49.06/0.97/32.00
Norwegian Nynorsk	95.71/*/94.00	47.85/*/36.00	**42.33/1.13/34.00**	13.50/2.31/10.00	42.33/1.13/34.00	39.88/1.23/30.00
Persian	100.00/*/100.00	99.82/*/92.00	**99.20/0.01/68.00**	**99.20/0.01/68.00**	73.42/0.72/52.00	84.69/0.43/48.00
Polish	100.00/*/100.00	73.24/*/16.00	**64.53/0.52/16.00**	35.47/1.25/0.00	56.72/0.65/16.00	55.19/0.82/10.00
Portuguese	100.00/*/100.00	98.35/*/92.00	**96.94/0.04/76.00**	91.71/0.10/64.00	91.71/0.10/64.00	89.94/0.12/50.00
Quechua	100.00/*/100.00	100.00/*/100.00	**99.98/0.00/96.00**‡	98.09/0.06/38.00	91.33/0.17/92.00	79.84/0.58/2.00
Romanian	44.97/*/76.00	28.70/*/18.00	**25.00/2.33/18.00**	11.69/3.06/2.00	14.20/2.47/14.00	10.36/6.89/10.00
Russian	96.01/*/88.00	58.44/*/8.00	**46.17/0.75/8.00**	33.90/1.21/2.00	40.18/0.81/8.00	36.66/1.21/8.00
Scottish Gaelic	100.00/*/100.00	58.30/*/4.00	**50.61/0.87/4.00**	42.91/2.07/4.00	44.13/0.96/0.00	29.96/1.41/0.00
Serbo-Croatian	37.08/*/68.00	64.25/*/44.00	**40.46/1.49/4.00**†	**40.46/1.49/4.00**†	30.07/2.51/44.00	27.90/2.90/44.00
Slovak	100.00/*/100.00	62.92/*/8.00	**53.65/0.81/4.00**	31.55/1.40/2.00	44.39/0.90/6.00	38.86/1.29/6.00
Slovene	97.56/*/98.00	86.85/*/56.00	**79.28/0.41/32.00**	54.13/0.76/6.00	57.74/0.90/44.00	52.15/1.35/14.00
Sorani	90.36/*/56.00	74.73/*/48.00	**57.65/0.72/0.00**	**57.65/0.72/0.00**	54.78/0.96/24.00	43.53/1.70/24.00
Spanish	100.00/*/100.00	95.82/*/60.00	**91.05/0.18/18.00**	**91.05/0.18/18.00**	79.75/0.38/50.00	79.58/0.41/38.00
Swedish	92.06/*/94.00	57.06/*/16.00	**51.18/0.90/12.00**	20.88/2.69/0.00	43.53/1.10/12.00	31.47/1.41/6.00
Turkish	90.44/*/94.00	88.93/*/44.00	**87.65/0.43/28.00**	**87.65/0.43/28.00**	20.93/3.80/14.00	34.89/2.47/6.00
Ukrainian	99.52/*/94.00	64.44/*/24.00	**49.21/0.94/6.00**	34.44/1.14/0.00	43.97/0.98/24.00	32.38/1.31/0.00
Urdu	100.00/*/100.00	95.85/*/36.00	**88.53/0.32/4.00**	**88.53/0.32/4.00**	80.59/0.25/32.00	79.56/0.27/8.00
Welsh	100.00/*/100.00	95.03/*/32.00	**89.89/0.19/8.00**	**89.89/0.19/8.00**	51.67/1.36/16.00	82.72/0.37/24.00

Table 21: Sub-task 2 Low Condition Part 1.